USAF Utilities Privatization
Lackland Air Force Base, Texas

Feasibility Analysis Report
Volume I

Prepared for
AFCESA
139 Barnes Dr., Suite 1
Tyndall AFB, FL 32403-5319

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June 1999

Limitations

During preparation of this report and its conclusions and opinions, certain assumptions have been made with respect to conditions that might occur in the future. Although these assumptions are considered reasonable for the purpose of this report, they depend on future events, and actual conditions might differ from those assumed. In addition, certain information has been provided by the Air Force and others. This information was not independently verified, and no assurances can be offered with respect to it. To the extent that actual future factors differ from those assumed herein or provided by others, the actual results will vary from those forecast.

This report also reflects current opinion on the legal and factual issues addressed, and it is based on current applicable legal authorities. Future court decisions, legislation, and other relevant developments, however, can change the law. Before applying this opinion in the future, therefore, it is essential to determine whether the law has changed in any respect that would necessitate a revision of the opinion expressed. This opinion is supplied solely for Air Force information and use in connection with the matters directly addressed in this report. The opinions herein are limited to the matters expressly stated. No opinion is implied, and none should be inferred, beyond the opinions expressly stated.

Executive Summary

Report Purpose

The purpose of this report is to determine whether privatization of the utility systems at Lackland Air Force Base (AFB), Texas, is feasible based on risk, regulatory, market, and economic considerations.

System Description

The study addresses potential privatization of the electric, gas, water, wastewater, and Total Energy Plant (TEP) systems at Lackland AFB.

Operational Risk Management

Using the methodology outlined in AF Pamphlet 91-215, Base personnel and senior leadership assessed the risk of privatization to Base operations. It was concluded that all identified risks could be mitigated; however, impacts from privatization of the TEP would result in high risks to the Base even with mitigation measures in place. A decision is needed as to whether this risk is within the Air Force's risk tolerance.

The most significant risks identified and associated mitigation measures were:

1. Inadequate response time to power outages resulting in mission degradation.
   Mitigation: Add response times with penalties.
2. Decreased service quality/reliability resulting in mission degradation.
   Mitigation: Add performance standards in the service agreement.

Regulatory Influence

The following table outlines the utility regulatory structure in Texas as it applies to the small portion of Lackland AFB that is not subject to exclusive federal jurisdiction.

Utility	Regulator	Regulation of Service Areas and Rates
Electric	Public Utility Commission of Texas (PUCT)	PUCT approval is needed to serve; to set rates.
Gas	Texas Railroad Commission (RRC)	No regulation of service area; RRC approval needed to set rates.
Water	Texas Natural Resource Conservation Commission (TNRCC)	TNRCC approval is needed to serve; to set rates.
Wastewater	TNRCC	TNRCC approval is needed to serve; to set rates.
TEP	None	

Competition

The following table indicates the level of anticipated competition and number of statements of interest received. The table also indicates, based on the regulatory structure, whether the sale will be open to competitive bidding or limited to sole source.

Utility	Level of Interest	Statements Of Interest	Acquisition
Electric	High	5	Competitive
Gas	High	6	Competitive
Water	High	6	Competitive
Wastewater	High	6	Competitive
TEP	High	6	Competitive

Economics

The following table summarizes the economics of privatizing each system. It indicates the replacement cost new less depreciation (RCNLD) value of each system, the level of capital needed to be invested in the system, and the present value (PV) of status quo costs, privatized costs, and savings resulting from privatization. When savings from privatization are positive, the system meets the economic criteria.

Utility	RCNLD	Capital to Remedy Deficiencies	PV Status Quo	PV Privatized	Life Cycle Savings	Economic
Electric	7,238	132	19,102	15,704	3,397	Yes
Gas	1,744	1,930	11,128	8,531	2,598	Yes
Water	8,426	3,477	33,229	17,350	15,879	Yes
Wastewater	5,235	2,541	9,393	7,208	2,185	Yes
TEP	28,903	37	117,789	96,800	20,989	Yes

Note: All values are in thousands of dollars.

Marketing Strategy

Based on market interest and the regulatory environment, service providers should be selected on a competitive basis. In order to receive highest value for the Air Force, bids should be requested from the list of alternative groupings of utilities included in the TRDP. Specific optional bid packages of utility systems are recommended in this report. Bidders could bid on as many packages as they would like.

Recommendations

Proceed to Phase II of the privatization process for all systems except the TEP. Obtain senior leadership decision regarding further consideration of the TEP in Phases II and III of the privatization process.

Wing Commander Recommendation: Exempt the TEP from further study of privatization. Although the Air Force determined methods for mitigating the risk subsequent to the operational risk workshop conducted for this report, the decision to not privatize was made because the TEP is essentially a large mechanical room with the sole purpose of providing energy to the WHMC.

Executive Summary—Texas Regional Demonstration Project (All Bases)

Reserved

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

MEMORANDUM FOR HQ AETC/CE

10 MAY 1999

FROM: 37 TRW/CC
1701 Kenly Ave., Ste 242
Lackland AFB TX 78236-5155

SUBJECT: Lackland AFB Utilities Privatization Analysis Phase I Decision

1. My staff has received and reviewed the Phase I Feasibility report for Lackland AFB for the water, wastewater, electric, and natural gas systems and concur with the report findings and recommendations. Request the Total Energy Plan (TEP) at Wilford Hall Medical Center (WHMC) be exempted based on the following justification.

2. WHMC is a complex of several buildings, some of which comprise the TEP. The TEP is an extremely complex cogeneration power plant, which is the sole energy services provider and an integral part of WHMC—in essence, a large mechanical room solely for WHMC. These energy services include electrical power, chilled water, steam, heating hot water, and domestic cold/hot water. Included in the TEP are towers, steam boilers, absorption chillers, natural gas turbine units, a high pressure gas regulator station, diesel-generating units, an array of electrical/mechanical controls, and aboveground fuel storage tanks. The by-products of TEP equipment operations produce energy to heat domestic water, steam for medical sterilizers and heating and chilled water for air conditioning.

3. I approve the four systems, excluding the TEP, at Lackland AFB proceeding to Phase II in accordance with the Air Force Utilities Privatization Policy and Guidance. Please contact Lt Col Larry Brittenham, 37 CES/CC, at 3-2977 should you have any questions.

BARRY W. BARKSDALE
Brigadier General, USAF
Commander

Attachment:
Decision Document

REC'D CH_2M SEA JUN 28 1999
REC'D CH_2M SEA

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON DC

JUN 1999

MEMORANDUM FOR AETC/CE

FROM HQ USAF/ILE
1260 Air Force Pentagon
Washington DC 20330-1260

SUBJECT: Lackland AFB Utilities Privatization Analysis Phase I Decision (your memo, 10 May 99)

Reference your memo requesting the Total Energy Plant (TEP) at Wilford Hall Medical Center (WHMC) be excluded from the utility privatization effort at Lackand AFB. We have reviewed your justification that the TEP is in essence a large mechanical room providing energy services as an integral part of WHMC and therefore should not be included.

We concur with your justification and approve the exclusion of the TEP from the utility privatization efforts at Lackland AFB. If we can be of further assistance, please contact Lt Col Alberto Armesto, AF/ILEIO, DSN 664-4220, or Maj Darren Gibbs, AF/ILEIO, DSN 664-4306.

MICHAEL A. AIMONE, P.E.
The Deputy Civil Engineer
DCS/Installations & Logistics

cc:
AFCESA/CC

15 JUN 1999
HQ AETC/CE

DIVISION	ACTION	INFO
CE		✓
CEB		✓
CEE		✓
CEEA		
CEC		
CEI		
CEO		✓
CEP		
CER		
CEV		
CC SUSP:		
BIB:		

Review and Approval

Lackland AFB TX (excluding the Total Energy Plant (TEP) at Wilford Hall Medical Center)

Electrical, Water, Wastewater, and Natural Gas Distribution Systems. There are no other regulatory constraints preventing the privatization of these systems. The operational impact and risk management analysis identified no hazards that would present an unacceptable risk if the systems were privatized. Several firms have responded to the market survey and indicated an interest in acquiring the systems at Lackland AFB. The economic analysis also indicates privatization is feasible.

Recommendation: Proceed to Phase II for all systems at Lackland AFB (excluding the TEP).

Alan Joel Bast

ALAN JOEL BAST, GS 11
Utility Privatization Project Manager

LARRY W. BRITTENHAM, Lt Col, USAF
Commander, 37th Base Civil Engineer

Ray T Garza

RAY T. GARZA, Colonel, USAF
Commander, 37th Support Group

10 MAY 1999

BARRY W. BARKSDALE, Brig Gen, USAF
Commander, 37th Training Wing

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Acronyms and Abbreviations

AC	asbestos cement
ACC	Air Combat Command
ACCRA	American Chamber of Commerce Researchers Association
ACHP	Advisory Council on Historic Preservation
ADAL	add / alter
AETC	Air Education and Training
ADD	average daily demand
AFB	Air Force Base
AFS	Air Force Station
AFCEE	Air Force Center for Environmental Excellence
AFCESA	Air Force Civil Engineer Support Agency
AFFARS	Air Force Federal Acquisition Regulations Supplement
AFI	Air Force Instruction
AFLMA	Air Force Logistics Management Agency
AFLSA	Air Force Legal Services Agency
AFLSA/ULT	Air Force Legal Services Agency Utility Litigation Team
AFM	Air Force Manual
AFREA	Air Force Real Estate Agency
AGA	American Gas Association
AGE	aerospace ground equipment
ANG	Air National Guard
APPA	American Public Power Association
ARAR	applicable or relevant and appropriate requirement
BCBC	Brooks City-Base Concept

BCP	base comprehensive plan
BRAC	Base Realignment and Closure
Btu	British thermal unit
CAC	cost account code
CADD	computer-aided drafting and design
CATEX	categorical exclusion
CBD	*Commerce Business Daily*
CCN	Certificate of Public Convenience and Necessity
CE	Civil Engineering
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEV	capitalized earnings value
cf	cubic foot
CFR	Code of Federal Regulations
cfh	cubic foot per hour
cfs	cubic foot per second
DERP	Defense Environmental Restoration Program
DFARS	Defense Federal Acquisition Regulations Supplement
DMR	Discharge Monthly Report
DO	Delivery Order
DoD	U.S. Department of Defense
DoDD	U.S. Department of Defense Directive
DoDI	U.S. Department of Defense Instruction
DRI	Defense Reform Initiative

EA	environmental assessment
EBS	environmental baseline survey
EIAP	Environmental Impact Analysis Process
EIS	environmental impact statement
EMCS	energy management and control system
EPA	U.S. Environmental Protection Agency
ERIS	economic resources impact statement
ESPC	Energy Savings Performance Contract
FAR	Federal Acquisition Regulation
FERC	Federal Energy Regulatory Commission
FM	Financial Manager
FONSI	Finding of No Significant Impact
FOSL	Finding of Suitability to Lease
FOST	Finding of Suitability to Transfer
ft	foot
ft^2	square foot
ft/s	foot per second
FTC	Fire Training Center
FTE	full-time equivalent (work year)
FY	fiscal year
FYDP	Five-Year Defense Plan
G&A	general and administrative (costs)
gal	gallon
gpd	gallons per day
gph	gallons per hour

gpm	gallons per minute
GSA	General Services Administration
GSE	ground support equipment
hp	horsepower
HQ	Headquarters
HVAC	heating, ventilation, and air conditioning
IDIQ	indefinite delivery/indefinite quantity
I/I	infiltration and inflow
in.	inch
IPT	Integrated Process Team
IRP	Installation Restoration Program
km	kilometer
kV	kilovolt
kWh	kilowatt-hour
L	liter
lb	pound
lf	linear foot
LID	local improvement district
LUD	local utility district
m	meter
MAJCOM	Major Command
MAOP	maximum allowable operating pressure

MCC	motor control center
MCF	thousand cubic feet (natural gas)
MDD	maximum day demand
MG	million gallons
mgd	million gallons per day
mgm	million gallons per month
MILCON	Military Construction
mV	millivolt
MVA	megavolt ampere
MW	megawatts
MWh	megawatt-hour
NAVFAC	Naval Facilities Engineering Command
NEPA	National Environmental Policy Act
NOV	notice of violation
NPDES	National Pollutant Discharge Elimination System
NPV	net present value
NWCF	Navy Working Capital Fund
O&M	operation and maintenance
OCLD	original cost less depreciation
OH	overhead
OMB	Office of Management and Budget
ORM	Operational Risk Management
OSD	Office of the Secretary of Defense
PCV	pressure control valve
PE	polyethylene

PG&E	Pacific Gas and Electric Company
PHD	peak hour demand
PLC	programmable logic controller
PM	preventive maintenance
PMP	Program Management Plan
POL	petroleum, oil, and lubricant
POM	Program Objective Memorandum
POTW	Publicly Owned Treatment Works
PPP	Priority Placement Programs
psi	pound per square inch
psig	pound per square inch gauge
PUCT	Public Utility Commission of Texas
PUD	public utility district
PVC	polyvinyl chloride
QA/QC	quality assurance / quality control
QAE	quality assurance expert
RCN	replacement cost new
RCNLD	replacement cost new less depreciation
RCRA	Resource Conservation and Recovery Act
RIF	reduction in force
RFI	request for statement of interest
RFP	request for proposal
ROD	Record of Decision
Rpr/Rpl	repair / replace
SA-ALC	San Antonio—Air Logistics Command

SAF	Secretary of the Air Force
SAF/AQ	Assistant Secretary of the Air Force, Acquisition
SAF/AQC	Deputy Assistant Secretary of the Air Force, Contracting
SAF/FMB	Deputy Assistant Secretary of the Air Force, Budget
SAF/FMC	Deputy Assistant Secretary of the Air Force, Cost and Economics
SAF/GCN	Deputy General Counsel for Installations and Environment, Department of the Air Force
SAF/LL	Assistant Secretary of the Air Force, Legislative Liaison
SAF/MII	Deputy Assistant Secretary of the Air Force, Installations
SAF/PA	Deputy Secretary of the Air Force, Public Affairs
SCADA	supervisory control and data acquisition
scfd	standard cubic feet per day
scfh	standard cubic feet per hour
SIC	Standard Industrial Classification
SOI	statement of interest
SOQ	statement of qualifications
SRAR	Shop Rate Analysis Report
SSA	Source Selection Authority
SSET	Source Selection Evaluation Team
SSP	Source Selection Plan
TEP	Total Energy Plant
TOA	total obligation authority
TRDP	Texas Regional Demonstration Project
UG	underground
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force

USAF/DPP U.S. Air Force, Division of Personnel Programs, Education, and Training; Deputy Chief of Staff, Personnel

USAF/ILE U.S. Air Force, Office of the Civil Engineer

USAF/ILEC U.S. Air Force, Engineering Division, Office of the Civil Engineer

USAF/ILEI Competitive Sourcing and Privatization Division, Office of the Civil Engineer

USAF/ILEO Operations Division, Office of the Civil Engineer

USAF/ILEP Programs Division, Office of the Civil Engineer

USAF/ILEV Environmental Division, Office of the Civil Engineer

USC United States Code

UST underground storage tank

VCP vitrified clay pipe

yr year

1.0 Introduction and Approach

1.1 Project Overview and Objectives

This Feasibility Analysis Report has been prepared by CH2M HILL under Air Force Civil Engineer Support Agency (AFCESA) Contract No. F08637-94-D-6002 to support privatization of the electrical, water, wastewater, and natural gas utilities at Lackland Air Force Base (AFB), Texas. Privatization is the process by which the U. S. Air Force (USAF) will transfer to a utility company or other qualified entity the responsibilities for system ownership and the obligation to provide quality service to all installation facilities. The Air Force is privatizing installation utilities in accordance with the Defense Reform Initiative (DRI) of November 1997, which requires that all Department of Defense (DoD) utility systems be privatized (except those needed for readiness or unique security reasons or when privatization is uneconomical). Title 10, §2688, Utility System Conveyance Authority, of the U.S. Code (10 USC §2688) provides the legislative authority for utility privatization.

The Installation/Wing Commander will use the results of this analysis to execute appropriate privatization projects. The Major Command (MAJCOM) will assist and facilitate the privatization process and interact with HQ USAF/ILEI on policy issues and the Deputy General Counsel for Installations and Environment, Department of the Air Force (SAF/GCN) on legal issues. Headquarters, Air Force Civil Engineer Support Agency (HQ AFCESA) and Headquarters, Air Force Center for Environmental Excellence (HQ AFCEE) will provide technical and contract support for performing the required analyses.

The Air Force has developed the following process for utilities privatization:

- **The Preliminary Screening Process** is performed for all programmed utility systems to determine which systems are exempt from privatization for readiness or unique security reasons. Exemption decisions are made by the Secretary of the Air Force (SAF).
- **Phase I: Project Plan and Feasibility Analysis.** This phase results in the Project Plan and Feasibility Analysis Report. The Project Plan establishes the scope and management components of the privatization project. The Feasibility Analysis identifies those utility systems for which privatization is economically viable, and determines whether responsive proposals for the purchase of the system(s) are likely to be received.
- **Phase II: Comprehensive Analysis.** This phase results in a Draft Comprehensive Analysis Report and Draft Request for Proposal (RFP). The Comprehensive Analysis Report includes analyses on real estate, environmental, transition, and planning issues

affecting privatization. This phase also determines appropriate terms and conditions to be factored into preparing the Draft RFP.

- **Phase III: Final Feasibility, Approval, and Implementation.** This phase results in an Approval Package submitted for SAF approval. This Approval Package includes the Final Comprehensive Analysis Report and the final revised proposal of the selected offeror. The Final Comprehensive Analysis Report includes a certified Economic Analysis and updates to the transition plans all based on the final revised proposal of the selected offeror.

Once each phase is completed, the resulting documents will be reviewed to determine whether to proceed to the next phase or exempt the utility system from privatization. Only the SAF can exempt a utility system from privatization.

This Feasibility Analysis Report presents the results of the analyses performed under Phase I in order to justify: (1) continuing on to Phase II, or (2) eliminating a utility (or utilities) from further consideration for privatization.

This project for Lackland AFB is part of the Texas Regional Demonstration Project (TRDP) for privatization of utility systems on Air Force utility systems in Texas.

1.2 Lackland Air Force Base Overview

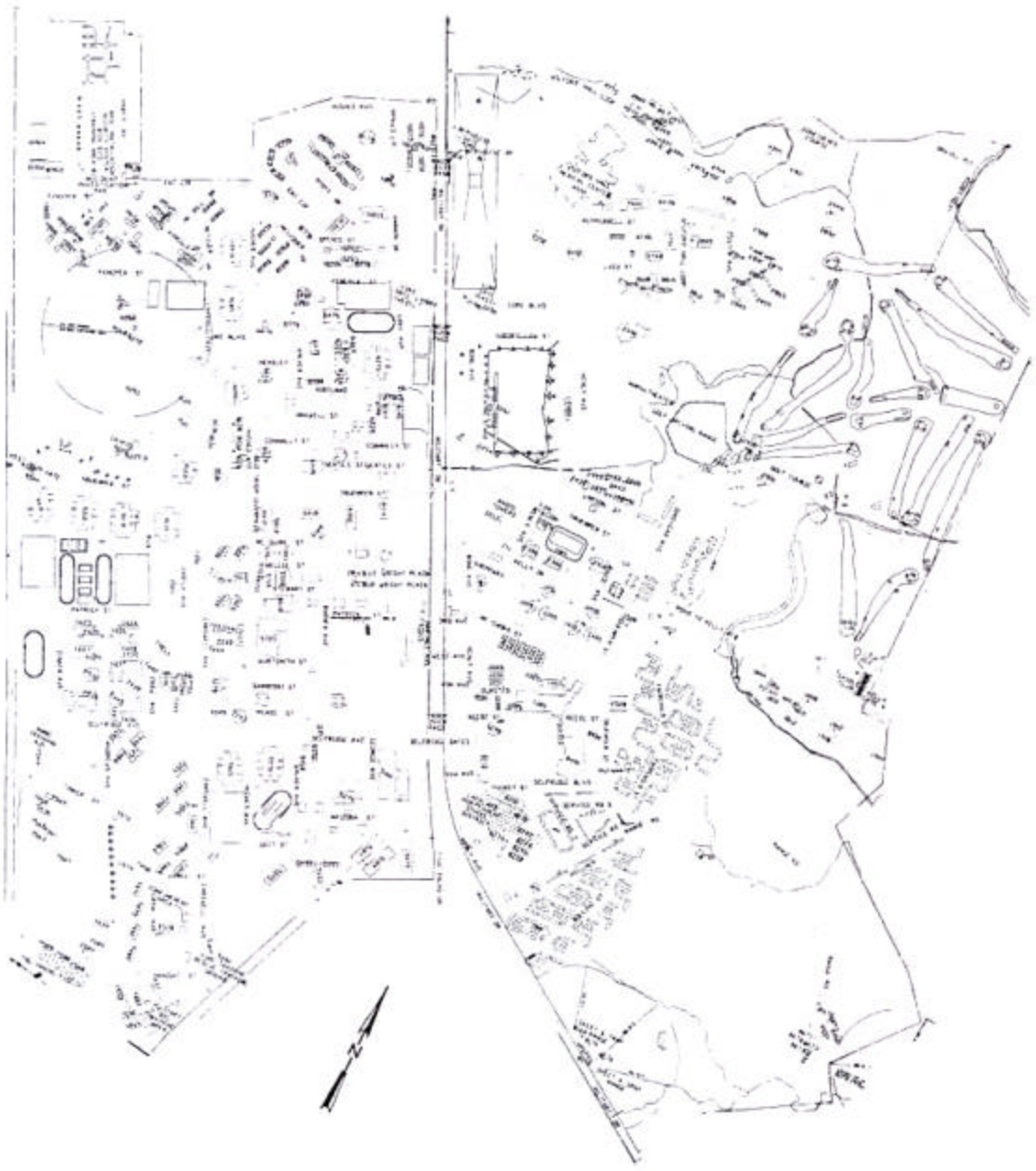
Lackland AFB, located approximately 8 miles southwest of downtown San Antonio in Bexar County, Texas, is an Air Education and Training Command (AETC) installation that annually provides basic military training for more than 35,000 recruits entering USAF, Air National Guard (ANG), and Air Force Reserve (AFR). The Base also hosts professional, technical, and English language training for approximately 36,000 students from all military services. The host command is the 37th Training Wing (37 TRW), USAF's largest training wing. The Base also hosts more than 35 tenant units; the primary tenants include:

- 59th Medical Wing, Wilford Hall Medical Center
- Air Force Security Forces Center
- Medina Regional Signal Intelligence (SIGINT) Operations Center
- 76th Munitions Squadron
- 369th Recruiting Group
- Force Protection Battlelab

Lackland AFB occupies 6,725 acres divided into two areas: the main Base occupies 2,752 acres, and the Training Annex, located 1 mile west, occupies 3,973 acres. The Base contains approximately 1,400 buildings totaling over 11 million square feet (sf).[1] Figure

[1] The nonresidential structures include offices, industrial maintenance and repair facilities, and community service facilities (e.g., schools and Wilford Hall Medical Center). The housing units include detached single residences, duplexes, townhouses, student dormitories, and recruit facilities.

1.2-1 shows the Base layout. Lackland AFB shares a common boundary with Kelly AFB to the east; the City of San Antonio surrounds the remainder of the Base.

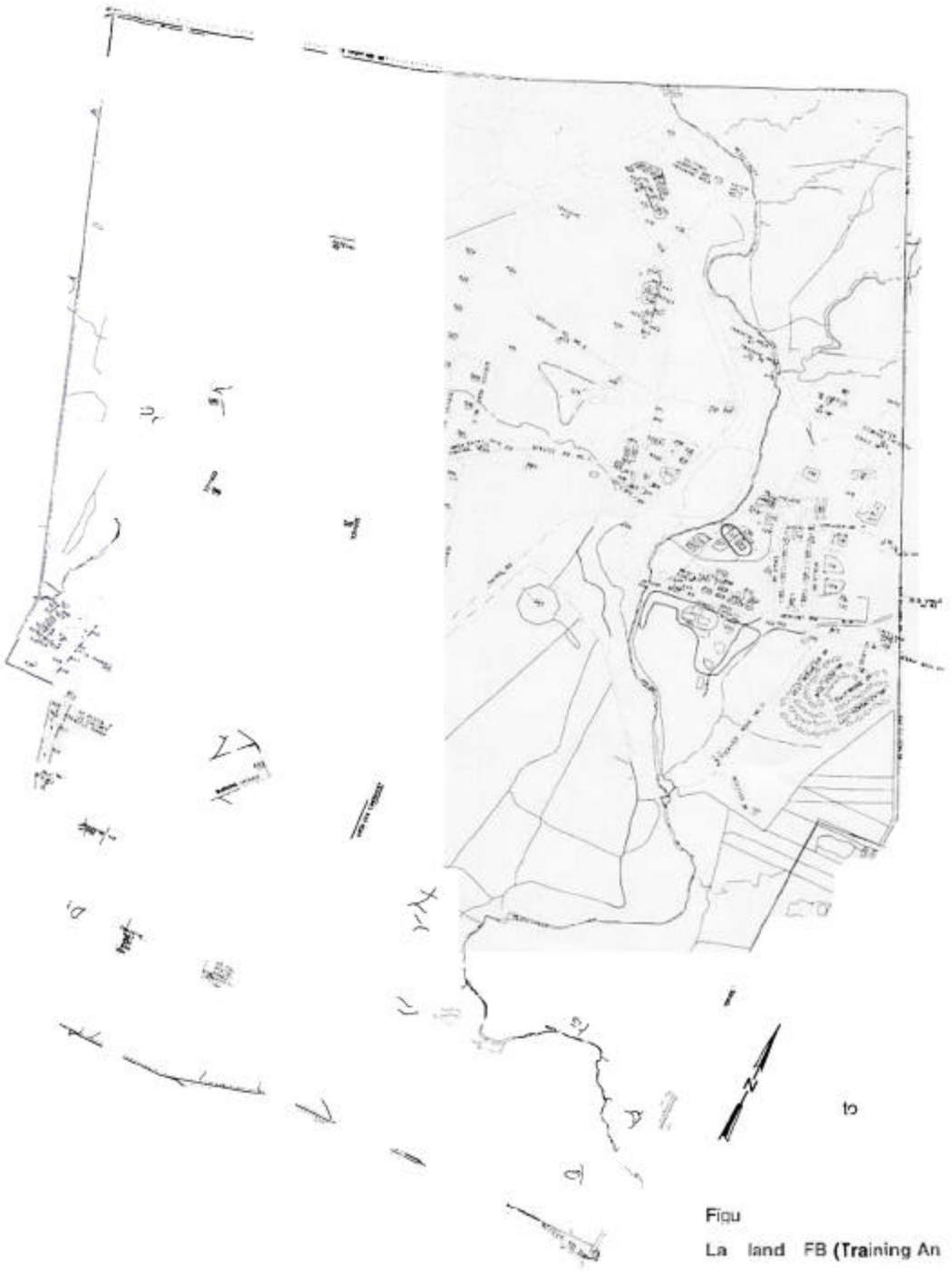


Not to Scale

igure 2

Lackland AFB (Main Base)

Reference: Real Property Records, 1998



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Property Records, 1998

The Base has a total population of approximately 20,000, including military personnel, civilian employees and support personnel, and dependents. In addition, more than 9,000 students are housed at the Base on an average day. Lackland AFB's annual payroll is approximately $583 million (combined military and civilian), and the Base is estimated to contribute approximately $661 million to the local economy through civilian employment, contracting, and purchases from local businesses.

Lackland AFB was established as the Air Corps Replacement Training Center in 1941 on land that was then part of Kelly Field. The training center was redesignated as a separate installation, the San Antonio Aviation Cadet Center, in 1942, and finally as Lackland AFB in 1947. Since 1947, Lackland AFB has been USAF's primary installation for basic military training. The surge of enlistees during the Korean and Vietnam Wars resulted in successive waves of new construction and demolition as the installation's facilities were pushed beyond their limits. The land that now comprises the Lackland Training Annex was transferred from the Atomic Energy Commission to Lackland AFB in 1966 for use as an Officer Training School. The Training Annex now houses the 37th Training Group, the Inter-American Air Forces Academy, and other tenant organizations.

Recent Base Realignment and Closure (BRAC) actions have transferred several missions from Kelly AFB to Lackland AFB. These include Kelly's flightline and its associated missions and facilities, such as the 433rd Military Airlift Wing, the 149th Air National Guard, and HQ Air Intelligence Agency. These and other mission relocations have resulted in further demolition and new construction at Lackland AFB. Programmed major construction projects include new administrative, training, industrial, and community facilities; new and renovated housing; and utilities alterations/improvements to accommodate the realignment of Kelly AFB. Key projects planned for Lackland AFB will increase the total square footage of buildings on Base by about 4 percent. Key projects programmed for Wilford Hall Medical Center will increase the medical center's total square footage by about 1.2 percent.

1.3 Approach

This section provides an overview of the approach taken to conduct the feasibility analysis of the Utilities Privatization Process for the TRDP. More detailed discussion of the general approach to the feasibility analysis is included in the *Air Force Utilities Privatization Policy and Guidance Manual*, USAF, October 1998 (the P&G Manual).

In accordance with the P&G Manual, Phase I of the utility privatization process is executed at the installation level, with or without contractor support. The lead for developing the project will fall to the Installation Civil Engineer under the guidance of the Installation/ Wing Commander. In this case, AFCESA has contracted with CH2M HILL to assist Lackland AFB in preparation of the feasibility analysis.

The objective of Phase I was to determine whether privatization is likely to be both viable and economic. This information is needed for the Air Force to assure itself that an award will likely be made if it decides to proceed with Phases II and III of the privatization process. The products of Phase I are the Project Plan and the Feasibility Analysis Report. Once the report is completed, it is submitted to MAJCOM, AFCESA, and Air Staff. Following several tiers of review, the Wing must decide whether to approve the Go/No Go decision and receive MAJCOM endorsement. If a Go decision is made, Phase II of the study proceeds. If a No Go decision is made, it is forwarded to the SAF for approval to exempt the system(s) from the privatization program.

To coordinate project activities, the Air Force developed a Utility Privatization Project Integrated Process Team (IPT) for the TRDP. Members included representatives from each base, each affected command, Air Staff, AFCESA, DESC, and AFCEE. Organization charts and assigned responsibilities were included in the Project Plan, published in November 1998.

The primary effort in Phase I was preliminary research and analysis that led to preparation of this Feasibility Analysis Report. As noted above, the purpose of this analysis is to determine whether privatization is likely to be both viable and economic. Individual tasks included in the analysis are discussed in the following subsections. These tasks were conducted according to the task outline included in the project plan. In addition to discussion of the purpose of each task, a description of the technical approach to each is also presented.

1.3.1 Project Plan

The Project Plan describes the following:

- Project scope
- IPT team members and their responsibilities
- Communications plan and points of contact
- Project schedule
- Resources required to execute the project

The Project Plan was prepared with the input of each feasibility analysis team member and was formally submitted after the project kickoff meeting.

1.3.2 Kickoff Meeting

A kickoff meeting was conducted to familiarize all Air Force staff with the Utilities Privatization Process. In addition to participation by Base staff, the Air Staff, the command, AFCESA, and CH2M HILL project managers provided Utilities Privatization program and guidance overviews. The meeting was conducted in two parts:

- Initial segment. Team members were introduced to one another, and Base management and staff were briefed about the privatization process. Base personnel described the Base and its utility systems, and questions were answered.
- Second segment. This segment focused on Air Force delivery and review of data that were requested by CH2M HILL prior to the meeting .

1.3.3 Industry Market Analysis

Key to the feasibility of utility privatization is the interest of utility service providers in purchasing the systems and providing service to the Base. To determine the level of interest in the on-Base utility systems, a market analysis was performed. The analysis was based primarily on obtaining statements of interest (SOIs) from potential purchasers of the TRDP utility systems. The SOIs were obtained by the following actions:

1. An advertisement was placed in the *Commerce Business Daily* (CBD) on November 24, 1998. A copy of this advertisement is provided in Volume II, Section 2.0, of this report. The advertisement was a request for a statement of interest (RFI) from utility service providers who are interested in acquiring one or more of the TRDP utility systems. It provided:
   - A description of the purpose, approach, and utility systems included in the TRDP
   - A request for the interested party's ideas regarding, among other things, a conceptual rate plan, conjunctive billing[2], conceptual bases for a purchase price, and existing franchises vs. the interested party's ability to provide service
   - An e-mail address where more information about the opportunity could be requested
2. A number of national and Texas associations of electric, gas, water, and wastewater utilities were contacted and sent a copy of the advertisement. A listing of associations contacted is included in Volume II, Section 2.0. These associations were asked to distribute the RFI to their membership. Spot checks confirmed that this distribution occurred in many cases.

[2] For the purposes of this report, conjunctive billing is a billing practice under which utility service is delivered to several locations and the billing units for these deliveries are aggregated into a single quantity for billing purposes. By combining these units into a single quantity, the quantity is billed at a lower rate than would occur if the individual loads were billed separately. This is because rates are normally lower for larger uses.

3. Existing utility suppliers were contacted by telephone to make them aware of the privatization program and the RFI and to answer any questions they might have. Telephone conversation records are included in Volume II, Section 2.0.

4. Some private entities were directly contacted to be sure they were aware of the RFI.

On the basis of information received in response to the RFI, analyses were conducted to determine market interest in each utility; possibilities for bundling, or packaging, more than one utility together for a combined sale; and prospective purchaser ideas about rate structures, conjunctive metering, and purchase price.

1.3.4 Operational Impact Analysis

The operational impact is an important consideration in determining privatization feasibility. Operational impact analysis for this study was designed to:

- Determine potential negative impacts of utility privatization on Base operations and mission
- Assess the risk of the negative impacts occurring
- Identify mitigation actions to reduce these risks

CH2M HILL worked closely with the individual base privatization teams and key personnel to discern the potential impacts of the proposed privatization on existing and projected operations in and around the base. CH2M HILL used the risk management practices established in Air Force Pamphlet 91-215, Operational Risk Management (ORM) Guidelines and Tools, and provided in the P&G Guidance Manual, to identify potential hazards, assess risk, and analyze control measures. ORM workshops served as appropriate forums to allow CH2M HILL to work closely with key base personnel to perform this assessment. A separate workshop was conducted at each base, and all potentially privatized utilities were addressed together.

The technical approach used to conduct the ORM workshop at Lackland AFB and to analyze data obtained in the workshop is discussed in detail in the February 12, 1999, technical memorandum on Operational Impacts Analysis for the TRDP. This technical memorandum is included in Volume II, Section 3.0.

1.3.5 Regulatory Review

The regulatory rules and regulations are a controlling factor in development of the strategies to privatize utility systems. Because of the complex and specialized nature of this subject, especially in Texas, the services of a noted law firm were acquired to research the regulatory environment for utility privatization on Air Force bases in Texas. This research included review and evaluation of:

- Pertinent case law

- Existing rules and regulations of the three Texas commissions that have jurisdiction over the various utilities for which privatization is being considered
- Existing and pending state legislation
- Federal and state jurisdictional issues

Legal research was conducted, commissioners and commission staff were interviewed, and pertinent documents acquired. Evaluation was made of:

- Whether utility service on Base is subject to commission regulation
- Service area and franchise rights
- Abilities of potential bidders for Air Force utilities to obtain certification and the right to serve
- Overlapping jurisdiction of state commissions and municipalities
- Ratemaking requirements and constraints
- Metering options
- Sales price implications of regulatory rules
- Service standards

Based on this research and analysis, conclusions were drawn about the ability of the Air Force to sell each of its utility systems through a competitive process, whether rates can be negotiated with the successful bidder for the utility systems, possible constraints to potential sales prices, and whether conjunctive billing of Air Force utility usage is feasible.

1.3.6 Utility System Evaluation

To understand the marketability of each utility system being considered for privatization, each utility system was evaluated. This evaluation included:

- An overview of the utility system. This included developing an understanding of the system and developing a database on the system inventory and its value in terms of its replacement cost new (RCN) and replacement cost new less depreciation (RCNLD).
- A utility system requirements assessment. This included estimation of the existing and future loads and assessment of the existing system capacity. Assessment of the existing capacity included analysis of its ability to meet future loads, compliance with regulations, and overall condition.
- A review of the on-Base capacity relative to off-Base capacity.

Each of these evaluations is discussed below.

System Overview

An overview of each utility system was obtained in the following three steps:

1. A site visit was conducted to observe the system condition; review pertinent utility system records, reports, and plans; study system maps; and discuss the characteristics and operations of the utility with system operators.

2. Operations personnel were interviewed to:

- Determine the approximate age of the various system components.

- Understand system loading and capacity characteristics and balances. In these interviews, data were obtained regarding system outages and capacity problems (if any).

- Become familiar with any operational problems.

3. Plans for future Base expansion over the next 5 years were reviewed with operations personnel. Also discussed were operator experience with past facility renewals and upgrades and their effect on the system operations.

An inventory of the utility system assets was conducted to establish a list of system assets. The inventory was developed primarily from "take-offs[3]" from system drawings. As guidance for these take-offs, interviews were conducted with system engineers and operations and maintenance staff, property records were reviewed when certain data were not available from maps, and physical observations were made. In some cases, when data were not available, estimates were made. For example, when the diameter of a specific buried line was not known, it was estimated based on system diameters upstream and downstream from the pipe of unknown diameter.

Once the inventory listing was complete, the RCN value of the system was estimated by multiplying current installed unit costs for a given inventory component times the number of those units included in the inventory. The bases for estimating these unit costs were primarily from the following sources:

1. Information obtained from consultant cost estimating and engineering departments. These data were developed from actual construction experience on similar electrical projects. This experience was compared to recent projects that were completed by an independent contractor, as well as information gathered from other consultants on recent bid proposals received.

2. Richardson Engineering Services. *Process Plant Construction Estimating Standards.* Mesa, Arizona. 1998.

[3] Take-offs are estimates of physical inventories based on information taken from system maps.

3. R.S. Means Co. *Building Construction Cost Data*. 56th Annual Edition. Kingston, Massachusetts. 1998.

4. Manufacturers' material and equipment cost estimates and quotations.

Unit costs were also based on the cost of building the utility facilities today with existing conditions and technology. For example, in cases where new materials have been developed that are lower cost and perform as well as existing facilities, the value of the lower cost facility was assigned to the existing facility. Because the new material (e.g., plastic pipe) served the same function as the more expensive, outdated material (e.g., steel pipe), the outdated material was considered to be worth only the cost of the new material.

To determine the RCNLD value of the system, the percentage of remaining useful life was determined for each system component and multiplied times the RCN value for the component. The percentage of remaining useful life was determined in a four-step process as follows:

1. The age of each system component was estimated. This was generally based on information available from operating personnel and from Air Force records.

2. The expected life of each system component was estimated on the basis of engineering judgment and Air Force estimates.

3. Dividing the age of specific components by its expected life yielded an estimate of the percent by which the component had depreciated.

4. Subtracting this percentage from 100 percent yielded the percentage of remaining useful life for the component.

Utility System Requirements

The purpose of this task was twofold:

1. Determine whether system deficiencies exist relative to the existing system's capacity to:

- Meet existing and future loads
- Meet regulatory requirements
- Perform reliably

2. Determine whether any excess capacity exists on Base that might have off-Base value, or if excess capacity exists off Base, that might have on-Base value

This task involved the following specific analyses.

Current and Future System Loads

This included identification of major planned construction or mission changes through the year 2003 and evaluation of the impact these changes will have on system requirements. Future loads were estimated by prorating existing loads on the basis of the planned relative change in the square footage of buildings on Base. These forecasts were tempered by consideration of the Base's conservation plans.

System Capacity

Ability to Meet System Requirements. This consisted of an engineering review of the system by reviewing operating records and the experience of Base personnel who operate the system. Existing capacity was determined for system components and for the system as a whole and evaluated against estimated system peak demands. Load flow models were not available for this analysis. Any system problems in meeting existing or forecast loads were identified as system deficiencies.

Compliance with Regulatory Requirements. As part of the system tour and in interviews with Base personnel, a review was made to determine whether the system had any major violations of existing or expected regulatory requirements. Any observed violations were identified as system deficiencies.

System Condition. A facility condition assessment was conducted in concert with the inventory development. The assessment was made to identify deficiencies, both physical and functional, that must be corrected to bring the utility system to industry standards. The assessment was accomplished by reviewing Civil Engineering Programming documentation, Findings and Recommendation studies, maintenance records, interviews with operators and users, and minimal physical surveys. If deficiencies were identified, remedies were defined and associated costs were estimated. Depending on the deficiency, the remedy could include repairs to existing plant or new construction.

Off-Installation Capabilities

The possibility of excess capacity in each system was evaluated to determine whether it could be productively used for off-Base purposes after acquisition by a private entity. This would be a factor in acquisition strategy and could influence bundling, marketing strategies, and economic factors discussed later in this section. Similarly, off-Base capacity was evaluated to determine whether existing on-Base capacity could more effectively be provided from off-Base. This related primarily to water supply and wastewater treatment possibilities.

1.3.7 Preliminary Economic Analysis

The economic analysis involved completion of the Preliminary Economic Analysis process described in the P&G Manual. The intent of this analysis was to eliminate from further evaluation utility privatization prospects that are highly likely to be uneconomical.

The preliminary economic analysis consisted of developing cash flow projections for costs associated with both the status quo and privatization alternatives and then comparing the

present value of one with the other. Consistent with guidance in Air Force Manual 65-506, Economic Analysis, a 25-year cash-flow of costs for both alternatives was projected. For this analysis, the base year of the costs was fiscal year (FY) 2001; cash flows were projected in constant FY 2001 dollars.

The cash flow projections and present value calculations are discussed below.

Projected Cash Flow—Status Quo Alternative

The cash flow for costs associated with the status quo included projections of operating and capital costs. Capital costs were projected to include costs to remedy system deficiencies and annual renewal and replacement costs. Each of these is discussed below.

Operating Costs

For this analysis, operating costs are defined to include the cost of operation, maintenance, and administration. They include "general and administration" (G&A) costs but exclude capital costs for renewals, replacements, upgrades, and extensions of the system. Analysis was conducted to determine the actual operating cost of the status quo for the electric, gas, water, and wastewater utilities.

The Air Force does not keep a separate set of financial records focused on the cost to operate, maintain, and administer individual Base utility systems. As a result, actual operating costs were estimated for this study. The approach taken to make these estimates is detailed in a technical memorandum titled Approach to Estimating Status Quo Operating Costs, Lackland AFB, and included in Volume II, Section 1.0, of this report.

Cost to Remedy System Deficiencies

If deficiencies were identified, the cost to remedy the deficiencies was estimated. In some cases, these estimates were available from Air Force plans. In other cases, the cost of these remedies was estimated for this report. Generally, it was assumed that these remedies could be accomplished in the first year of the projected cash flow, 2001. In cases where major projects were identified, the cost of the remedy was spread over the first two years, 2001 and 2002.

Renewal and Replacement Costs

In addition to normal operating costs, each utility system must be maintained in good operating condition through normal renewals and replacements of system facilities. These activities are generally not uniform, because facilities tend to wear out and need replacement intermittently. However, for the purposes of this preliminary economic analysis, the annual cost of these renewals and replacements was projected based on an average annual amount. Given that the cash flow was projected in constant 2001 price levels, this uniform annual cost would naturally be the same as the average annual depreciation rate and was therefore projected on the basis of this rate. The average annual depreciation rate was calculated based on the weighted depreciation rate of each system component. This was done by determining the proportion of the system

component cost to the total system RCN value, multiplying this percentage times the depreciation rate for the given component, and summing the resulting ratios for each system component. Multiplying the resulting weighted depreciation rate for the system as a whole times its RCN value provided the annual system depreciation in 2001 dollars. This value was assumed equal to the average needed renewal and replacement investment for the system.

The exception to this approach was for the natural gas system on Base. Because it will be essentially a new system after system deficiencies are remedied, it was projected that the need for renewals and replacements will be minimal during the 25-year forecast period. The approach to projecting renewals and replacements for the gas system is described further in Section 6.0.

Adjustments to Status Quo Costs

Critical review of existing utility system operations showed that they might or might not reflect the activities that should be conducted by the Air Force to maintain the system in good condition. In cases where it was concluded that the activities that should be conducted differed from actual activities, the status quo costs were adjusted to "should costs." These are referred to as "adjusted status quo costs" in this study. These costs were used in the projected status quo operating cost projections for the preliminary economic analysis.

Projected Cash Flow—Privatization Alternative

The Air Force's projected cash flow for the privatization alternative would include a rate to be paid for the utility service on Base as well as a negative cost in the form of a cash inflow from the proceeds of the utility system sale. It was assumed that the utility service rate would include components for the privatizer to recover its operating costs, its capital costs to remedy system deficiencies and make normal renewals and replacements, and its purchase payment for the utility system.

In addition, the Air Force would incur transition costs to continue the privatization process. After transition of ownership, the Air Force would incur costs to administer its relationship with the utility service provider on Base. Finally, the cost of capital for privately owned utility service providers is higher than it is for the Federal government and publicly owned utilities. For private utility service providers, this higher cost of capital is also considered.

Each of these costs is discussed below. Also discussed below is the cost of metering options normally considered in the context of utility privatization.

Operating Costs

Operating costs for the privatization alternative were estimated based on two variations from the adjusted status quo costs. These variations are in the labor required to operate,

maintain, and administer the system, and in the wage rate, including benefits, that would need to be paid for this labor.

Operating costs incurred by a utility service provider at Lackland AFB would depend on the utility service provider that acquires the utility system. Existing utilities in the immediate area would have a different approach to the operation and maintenance of the utility system than would other interested entities that do not currently provide utility service locally. This is because existing, local utilities can incorporate the Base's utility system into their existing operation with relatively little extra effort.

Remote utility service providers, on the other hand, would find it necessary to place someone on the Base either in a part-time or full-time capacity to monitor and act as a service coordinator in the event of a service interruption. Repair work would be done either through the corporation's own forces or through maintenance and service contracts with local providers.

Costs of both existing local utilities and remote utility service providers were considered in developing cost inputs for the evaluation of the privatized alternative. However, the projected cost for operation and maintenance by a credible least cost utility service provider was used in the projection of privatized operating costs.

Costs to Remedy System Deficiencies and Normal Renewal and Replacement Costs

Because it was assumed that the status quo would include full remedy of system deficiencies and adequate capital to keep the utility system in good shape, it was assumed for the purposes of the preliminary economic analysis that these costs would be the same for the privatization alternative.

Proceeds from the Purchase Price

In determining bids to buy or offers to sell, buyers and sellers consider a number of factors. For utility systems, those normally considered include the following:

- Original cost less depreciation (OCLD)
- RCNLD
- Capitalized earnings value (CEV)

These estimates normally vary widely but serve as a basis for ultimately determining a price.

OCLD is essentially the same as net book value of a system. As such, it does not include the effects of price inflation that occurred since the capital assets were originally placed in service. The value of each asset is reduced by the amount of depreciation that has occurred since the assets were placed in service. As discussed in Section 4.0, regulators use OCLD as the basis for ratemaking in Texas.

As noted above, RCNLD is calculated by estimating the cost of constructing the existing utility system with today's construction techniques and price levels. This value is then reduced by the percentage of depreciation that has occurred on the assets.

CEV is the present value of the bidder's projected return (difference between the new owner's projected revenue and costs) over time. Use of the CEV recognizes that funds invested in facilities are sunk. The focus is on future earnings or the difference between revenues and costs from ownership and operation of the purchased utility.

The actual value that will be associated with the successful bid for each utility system on Base is an uncertainty. It depends on a number of factors, including, most importantly, the rate for utility service to the Air Force that is included as part of the sales contract. For this preliminary economic analysis, it is not necessary to know the purchase price. The reason for this is that, assuming a long-term agreement for provision of utility service to the Air Force by the new utility supplier, the system purchaser will fully recover its purchase price payment through rate charges to the Air Force. This is logical because the Air Force and its tenants are the only customers from which the new utility owner will be able to recover its costs. As a result, in the privatized cash flow projection, the negative cost of the sales proceeds to the Air Force will be cancelled out by the recovery of these costs in the purchaser's rates for utility service to the Air Force. Therefore, the utility system purchase price and the component of the privatizer's rate to recover these costs are not included in the preliminary economic analysis.

Cost of Capital

All other factors being equal, there is a difference in the cost of capital between publicly and privately owned utility service providers. Publicly owned utilities have an intrinsically lower real cost of capital than do privately owned utilities. This is documented in many places in economic and financial literature. A good explanation of this difference is included in the 1991 Northwest Conservation and Electric Power Plan (Northwest Power Planning Council, 1991). An excerpt from this plan that includes discussion of this difference in capital costs is included in Volume II, Section 1.0 of this report.

Among other factors, Federal income tax must be paid on returns to private capital. This tax is paid on debt in that the interest income to lenders holding this debt is subject to Federal income tax. Further, returns to equity capital are taxed as net income to the corporation and to its stockholders. However, because Federal income tax is paid to the Federal government, the component of a utility service provider's rates that cover this cost is not a true cost when charged to the Air Force. The payment of this implicit rate component by the Air Force is eventually received by the Internal Revenue Service. Therefore, the net cost of this rate component to the Federal government is zero. The real cost of capital assumed for private entities in the preliminary economic analysis therefore excluded Federal income taxes.

Nonetheless, the overall real cost of capital for private industry even after adjusting out Federal income tax is greater than the cost of capital for most publicly owned utilities. For this analysis, the real cost of capital for privately owned utility service providers was assumed to be 5.0 percent per year. This rate is based on analysis included in the 1991 Northwest Conservation and Electric Power Plan. The cost of capital for publicly owned utilities was assumed to be 2.9 percent per year. This cost of capital is the same as was used for the cost of capital for the Federal government. The Federal government cost of capital is specified in *Guidelines and Discount Rates for Benefit Cost Analysis of Federal Program*, Office of Management and Budget (OMB) Circular A-94, updated February 1999.

The cost-of-capital difference between publicly owned and privately owned entities affected the economic analysis in one way. It was assumed that the purchase price of the system would be financed with the Federal government, with payments being used to offset rate charges by the utility service provider. However, it was assumed that a privately owned utility service provider would finance renewals and replacements in the utility system with its own long-term financing. The premium the Federal government would have to pay for this rate component compared with that for a publicly owned utility was calculated. This calculation is shown in Volume 2, Section 1.0.

Transition Costs

To privatize any utility system, the Air Force must follow the process identified in the P&G Manual. As described above, this report is being submitted at the end of the first of three phases outlined in the P&G Manual. It is assumed that, if the Air Force proceeds with Phases II and III of this process, it will incur costs of $150,000 per utility.

Post-Award Administrative Costs

Once a system is privatized, the Air Force will incur new costs to oversee utility operations by the utility service provider on Base. It was estimated that this will require the services of 0.25 full-time equivalent (FTE) per privatized utility.

Metering Options

Currently, the Base receives its utility supplies from off-Base suppliers and distributes the commodity on Base. It is metered at the point(s) of delivery from the off-Base supplier. In distributing the commodity to facilities on Base, the Air Force meters usage at only a limited number of facilities. These facilities are either metered as a basis for charging on-Base tenants for their utility usage or for monitoring usage as part of a conservation program.

The only utility usage that is not metered on Base is wastewater collection. Wastewater generation is metered for the Base as a whole, but metering of individual points of generation is impractical. Wastewater service for individual buildings is normally billed by wastewater utilities on the basis of metered water service during the winter months. This practice is based on the assumption that irrigation is at a minimum during the winter

and, therefore, usage during winter months reasonably approximates the amount of wastewater generated.

The metering options for facility use on Base range from doing nothing to metering usage at each facility with utility service. The purpose of metering use by individual facilities is primarily to generate accurate data upon which service charges can be levied or from which usage can be monitored for conservation or other building management purposes.

The cost of installing meters at all currently unmetered facilities on Base was estimated for the electric, natural gas, and water utility systems. The number of unmetered facilities was estimated and segmented into facilities that would require different-sized meters. Then the average installed cost of the meter for each of these respective groups was multiplied by the number of facilities in the group to determine the overall metering cost for each group. The cost estimate for the groups was then summed to calculate the estimated cost to meter all Base facilities.

The cost of meters was not included in the life-cycle cost comparison of the status quo and privatized alternatives. This is because metering would not necessarily be required for privatized utility service. As noted in the market and regulatory sections of this report (Sections 2.0 and 4.0), conjunctive billing is feasible for all utility service on Base. Given that all military uses on Base could be aggregated for billing purposes, there would be no billing need for individual metering. Air Force usage could be conjunctively billed on the basis of the aggregate loads metered at the existing point(s) of delivery for the Base.

Present Value Calculations

The present value of the projected cash flow for both the status quo and the privatization alternative was calculated at a 2.9 percent real discount rate. This discount rate is specified in Appendix C to *Guidelines and Discount Rates for Benefit Cost Analysis of Federal Program*, Office of Management and Budget (OMB) Circular A-94, updated February 1999.

The conclusion about the economics of privatization was prepared based on a comparison between the present value of the costs for the adjusted status quo and privatization alternatives.

1.3.8 Marketing Strategies

The strategy for marketing the utilities at Lackland AFB was developed based on information from the requirements, regulatory, market, and economic analyses. The marketing strategies were developed in concert with development of marketing strategies for the other Air Force bases included in the TRDP. This included detailed consideration of bundling options for selling utilities within bases together as well as selling like utilities from a number of bases. The following issues were considered in developing the marketing strategy:

- System requirements and capacity
- Market interest
- State regulations
- Commodity supply options
- Economic analysis of privatization

The following issues were considered in selecting bundling options for this procurement:

- Market interest
- Economies of scale
- Service quality
- Existing utility suppliers and service areas
- Potential complexity of proposal evaluations

On the basis of these considerations, a marketing strategy was developed for all utilities included in the TRDP.

1.3.9 Recommendations

As noted above, both the preliminary economic analysis and the marketing strategy were developed on the basis of information developed in the market, operational impact, regulatory, and requirements analyses conducted for Phase I of the privatization process. On the basis of the economic analysis and marketing strategies, recommendations were made regarding whether and how to proceed to Phase II of the process.

2.0 Market Analysis

This section presents the results of the industry market analysis for Lackland AFB. Section 1.0 describes the approach by which letters of interest from potential purchasers were solicited and evaluated. This section analyzes the responses from the interested utility providers in terms of the following issues:

- The overall level of interest in each utility system at Lackland AFB, including descriptions of the potential utility providers expressing interest (Section 2.1)
- Interest in bundling the Base utilities, and in bundling Lackland AFB utilities with utilities at other bases (Section 2.2)
- Rate concept preferences (Section 2.3)
- Potential metering and billing options (Section 2.4)
- Purchase price concepts (Section 2.5)

Section 2.6 summarizes the general findings of the market analysis for Lackland AFB. The utility-specific sections of this report (Sections 5.0 through 9.0) summarize the market analysis findings for the individual utilities. Section 10.0 presents marketing strategies developed based on the results of this market analysis.

2.1 Level of Interest and Interested Utility Providers

Table 2.1-1 lists the interested utility providers for Lackland AFB and indicates the utilities in which they expressed interest. The table also distinguishes between publicly and privately owned utility providers.

As shown, there are at least five interested providers for each utility system at Lackland AFB. The local service providers, City Public Service (electric and gas), and San Antonio Water System (water and wastewater) both expressed interest in the systems at Lackland AFB.

The following paragraphs describe the interested utility providers. These descriptions are summarized from the letters of interest and include as much of the following information as was provided by the respondents:

- Experience and capabilities
- Financial capacity
- Business size
- Their understanding of their legal / regulatory ability to provide service to the base
- Other pertinent legal / regulatory issues

Volume II of this report presents the actual letters of interest.

TABLE 2.1-1
Interested Utility Providers
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

Utility Provider	Utility of Interest				
	Electric	Natural Gas	Water	Waste-water	TEP
Publicly Owned Utility Companies					
City Public Service of San Antonio [a]	X	X	X	X	X
San Antonio Water System [b]			X	X	X
Privately Owned Utility Companies					
AquaSource	X	X	X	X	X
Enron	X	X	X	X	X
Entex		X			
Philip Utilities			X	X	
Texas-New Mexico Power Company	X				X
U.S. Filter-Morrison Knudsen	X	X	X	X	X
West Texas Gas		X			
TOTAL	**5**	**6**	**6**	**6**	**6**

TEP = Total Energy Plant serving Wilford Hall Medical Center
[a] Existing service provider for electric and natural gas.
[b] Existing service provider for water and wastewater.

2.1.1 Publicly Owned Utilities

City Public Service of San Antonio. City Public Service of San Antonio (CPS) owns, operates, and maintains San Antonio's electrical and natural gas systems. CPS is the second-largest municipally owned utility in the U.S., serving more than 530,000 customers with a total electrical generating capacity of approximately 4,500 megawatts. CPS has over 1,500 field crew personnel.

CPS operates under, and complies with, all local utility laws and the regulations governing them. It is also familiar with all state and federal environmental regulations, and maintains a staff of experts to respond to utility-related environmental issues. CPS is the current certificated natural gas and electric utility operator in the San Antonio area; its service area therefore encompasses Brooks, Randolph, and Lackland AFB. CPS believes that it has a franchise agreement with these installations. CPS also states that other

utilities wishing to operate within the certificated area of San Antonio must obtain a franchise agreement with CPS.

San Antonio Water System. The San Antonio Water System (SAWS) is a municipally owned water, wastewater, and recycled water utility that serves approximately 1.2 million customers in San Antonio and Bexar County. SAWS has assets of approximately $1.3 billion, and is committing more than $100 million over the next 5 years to construction of its recycle system. SAWS operates and maintains 85 wells, four wastewater treatment plants, and nearly 8,000 miles of water distribution mains and sanitary sewer mains. SAWS also operates a heating and cooling plant that provides steam and chilled water to a number of major buildings in downtown San Antonio. SAWS currently provides water to Brooks AFB, and wastewater treatment services to Brooks and Lackland AFB. It has also initiated an extensive water reuse program at Kelly AFB, and is planning similar projects at Brooks and Lackland AFB.

SAWS operates under, and complies with, all local utility laws and the regulations governing them. It is familiar with all state and federal environmental regulations, and maintains a staff of experts to respond to utility-related environmental issues. SAWS is also familiar with franchise agreements, and currently has a franchise agreement with the City of San Antonio.

2.1.2 Privately Owned Utility Companies

AquaSource. The letters of interest by AquaSource indicate that it proposes to partner with various electric utility cooperatives—Guadalupe Valley at Lackland AFB—to purchase the electric utilities at the bases.

AquaSource, Inc. is a water and wastewater utility company formed in June 1997 and headquartered in Houston, Texas. It is a wholly owned subsidiary of DQE, Inc., a Pennsylvania-based energy services company. AquaSource is the largest investor-owned water utility in Texas, and owns or operates water/wastewater utilities in nine other states. The company has acquired over $177 million in assets, including water and wastewater utilities, design-build companies, system leasing and fabrication businesses, and contract operation services, and expects to acquire an additional $100 million in early 1999. DQE has assets of over $4.6 billion and has made an initial allocation of $500 million to acquire water utilities.

AquaSource references its experience dealing with local, state, and federal legislation regarding utility operations and the environment, as well as its familiarity with state and federal legislation regarding privatization. The company also states that utility systems at the various bases appear to be “freestanding, self-contained systems” and may therefore be exempt from Texas laws regarding utility service areas and franchise requirements. AquaSource indicates that any purchase of the utility systems would be made at the Base fenceline, and the Base facilities “would not be commingled with other facilities of the supplier.”

Enron Federal Solutions, Inc. Enron Federal Solutions, Inc. (EFSI) is Enron Corporation's designated interface for federal government energy projects. Enron is a publicly traded Oregon company with approximately $28 billion in assets and $20.3 billion in revenues in 1997. Enron is one of the world's largest integrated natural gas and electric companies, and is the largest U.S. provider of these utilities. Enron delivered 192.3 megawatt-hours (MWh) of electricity and 110 billion cubic feet per day (BCF/day) of natural gas to U.S. customers in 1997. The company has approximately 20 percent of the non-regulated wholesale natural gas market in North America, and 34 percent of North America's non-regulated wholesale electricity market. Enron recently purchased Wessex Water in the United Kingdom for $2.2 billion, and is currently establishing Azurix, a U.S.-based water company that will own and operate water/ wastewater systems and treatment facilities.

Entex. Entex is a natural gas utility that serves 1.4 million customers in approximately 500 communities, including more than 300 communities in Texas. Entex distributes gas through 26,000 miles of main lines and 16,000 miles of service lines. The company's largest market is Houston, with 700,000 customers served. Entex provides natural gas service to several communities near Brooks, Randolph, and Lackland AFB.

Entex is an operating division of Houston Industries Inc., an international energy services company with annual revenues of approximately $9 billion and total assets of about $18.4 billion. Houston Industries is one of the largest combination electric and natural gas companies in the U.S. Entex states that, as a division of Houston Industries, it has the financial resources to purchase, maintain, operate, and expand natural gas distribution facilities.

Entex and its predecessor companies have provided natural gas service in Texas since 1866 and currently hold over 200 nonexclusive franchises in Texas. The company references its record of legal and operating compliance with each city, and its record of compliance with state and federal environmental regulations.

Philip Utilities Management Corporation. Philip Utilities is a contract operator of water and wastewater facilities that has expertise in engineering, maintenance, and operations. The company currently has 27 offices throughout North America and operates more than 20 water or wastewater facilities in the U.S. and Canada with a staff of more than 750. Philip Utilities and its subsidiaries have undertaken projects and contracts ranging in size from several thousand dollars to more than $100 million.

Philip Utilities is owned by two shareholders: Philip Services, a provider of industrial outsourcing services with 1997 sales of $1.8 billion and equity of approximately $450 million, and the Ontario Teacher Pension Plan Board, an investment fund managing $40 billion as of December 1996. They propose partnering with unnamed financial partners to provide any necessary additional funding.

Philip Utilities references its experience dealing with local, state, and federal legislation regarding utility operations, the environment, and its familiarity with state and federal legislation regarding privatization.

Texas-New Mexico Power Company. Texas-New Mexico Power Company (TNMP) provides electric generation, transmission, and distribution energy services to 220,000 customers throughout Texas and southern New Mexico. The company distributes electricity over 10,000 miles of primary distribution lines and more than 100 substations. It also owns, operates, and maintains a 300-megawatt (MW) coal-fired generating plant in central Texas that supplies about one-third of TNMP's power needs.

TNMP is a wholly owned subsidiary of TNP Enterprises, Inc., a publicly traded entity with a market capitalization of approximately $500 million. TNMP has approximately $1 billion in utility assets and currently generates a cash flow of approximately $100 million per year. The company states that a significant portion of its cash flow would be available to purchase, expand, and operate Air Force utility systems. It would also raise capital from debt and equity offerings and from commercial bank loans.

TNMP and its predecessor have provided electric utility service since 1925, and the company cites evidence of consistently meeting its service obligations. TNMP is thoroughly familiar with franchise regulations and service obligations that apply to electric utility operations. It has obtained all necessary Certificates of Public Convenience and Necessity (CCNs) in its Texas service area and has established all necessary franchise relations with relevant state and municipal regulatory agencies. However, TNMP states that CCN and franchise requirements likely do not apply to electrical systems at the bases because the jurisdiction of municipal and state regulatory authorities over the land covered by these systems is preempted by the federal enclave doctrine. TNMP states that, because of these unique jurisdictional circumstances, its obligation to serve would be based on the contract of sale between USAF and TNMP rather than on municipal and state regulatory jurisdiction. TNMP also references its understanding of all applicable environmental laws and regulations.

U.S. Filter/Culligan Operating Services, Inc. and Morrison Knudsen Corporation. The team of U.S. Filter / Culligan Operating Services, Inc. and Morrison Knudsen Corporation (U.S. Filter-MK) is a contract operator of water and wastewater facilities that has expertise in engineering, maintenance, and operations. They currently operate 163 water or wastewater facilities throughout the U.S. The U.S. Filter-MK team has undertaken projects and contracts ranging in size up to more than $200 million. U.S. Filter and MK are both publicly traded companies with 1997 combined total assets of approximately $2.9 billion.

U.S. Filter-MK referenced their experience dealing with local, state, and federal legislation regarding utility operations and the environment, and their familiarity with state and federal legislation regarding privatization. They indicated that they would obtain a CCN

for each base pursuant to Texas Administrative Code (TAC) Title 30, and stated that the CCNs would give them exclusive rights to serve the geographic area of each base. U.S. Filter-MK also indicated that current water/wastewater contracts with other utilities at some of the bases would be renewed if determined to be in the best interest of the Air Force and the utility. U.S. Filter-MK did not address regulatory issues associated with electric and natural gas utilities, but stated that their gas and electric partner(s) would be regulated utilities in the State of Texas.

West Texas Gas, Inc. West Texas Gas, Inc. (WTG) is a Texas public utility that owns and operates numerous interstate, intrastate, and local natural gas distribution pipelines. WTG serves approximately 23,000 residential, commercial, agricultural, industrial, and city gate customers in Texas and Oklahoma, and owns and operates the gas distribution facilities in 37 communities. The company also has non-utility operations including natural gas marketing, oil and gas production, propane distribution, and retail gasoline/convenience store outlets. The company's current annual sales volume is approximately 20,000,000 thousand cubic feet (MCF), and its assets total approximately $113 million. WTG is wholly owned by its president, Mr. J.L. Davis.

WTG has provided natural gas service since 1976 and understands its obligation to provide reliable service to its customers. The company indicates extensive experience in dealing with city governments regarding franchises, and has numerous franchise agreements in place. WTG also indicates understanding and compliance with all state and local laws, and the rules and regulations set forth by the Public Utility Commission of Texas (PUCT), DOT, and the Texas Railroad Commission (TRC). WTG typically conducts a Phase I or Phase II environmental study on facilities to be acquired to identify environmental compliance issues. The company is unaware of any applicable local regulations that may affect a gas distribution system operating within federal property boundaries.

2.2 Bundling of Utility Systems

RESERVED

2.3 Conceptual Rate Plans

This section summarizes the interested utility providers' proposed approaches to developing service rates. Table 2.3-1 summarizes the plans proposed for Lackland AFB. As this table shows, most interested parties are planning to propose a custom rate for service to Lackland AFB. These rates are likely to be based on the provider's direct cost to serve the Base.

The following paragraphs describe the proposed conceptual rate plans for Lackland AFB. These descriptions are summarized from the letters of interest.

2.3.1 Publicly Owned Utility Companies

City Public Service of San Antonio. CPS, which is currently reviewing its costs due to the unbundling of services in the electric and natural gas utility business, indicates that its monthly bill would consist of the best applicable rates for electric and gas service. The electric rate would also include a monthly facilities charge covering standard O&M expenses, required replacements / upgrades, and required new facilities (CPS does not anticipate this additional monthly charge for the natural gas utility). The electrical

TABLE 2.3-1
Conceptual Rate Plans
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

	Conceptual Rate Plan	
Utility Provider	**Existing Rate Schedule**	**New/Custom Rate for Lackland AFB**
Publicly Owned Utility Companies		
City Public Service of San Antonio		X
San Antonio Water System	X	
Privately Owned Utility Companies		
AquaSource		X
Enron		X
Entex		X
Philip Utilities [a]		
Texas-New Mexico Power Company		X
U.S. Filter-Morrison Knudsen		X
West Texas Gas		X

TABLE 2.3-1
Conceptual Rate Plans
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

	Conceptual Rate Plan	
Utility Provider	**Existing Rate Schedule**	**New/Custom Rate for Lackland AFB**

[a] Letter of interest did not address conceptual rate plans.

distribution O&M cost would be determined as a dollar amount per circuit mile, and will be adjusted annually to reflect additions to, or removals from, the system. Capital expenditures for replacements/upgrades would be recovered through leveled annual payments based on a 25-year facilities life span. The cost of construction to serve new facilities could be paid in full or included in the monthly facilities charge.

CPS did not provide information on rates for water/wastewater utilities, or the heating/cooling plant at Brooks AFB.

San Antonio Water System. SAWS indicates that the bases would pay SAWS's current published residential or commercial rates for water and wastewater service, and included these rates with their submittal. SAWS also notes that it is reevaluating its rate structure and may eliminate the current "Inside City Limit" (ICL) and "Outside City Limit" (OCL) differential in 1999. SAWS will evaluate the heating/cooling plant at Brooks AFB and the TEP at Lackland AFB in order to develop rates for those facilities.

2.3.2 Privately Owned Utility Companies

AquaSource. AquaSource proposes a rate plan based on either a cost-of-service or fixed-price concept; the company indicates that a fixed-price basis would likely reflect a higher price by requiring USAF to compensate AquaSource for risk and uncertainty that would be covered under a cost-of-service agreement. AquaSource indicates that the rate should be based on three things: recovery of expenses, recovery of AquaSource's capital investment, and a return on its investment. The company cites requirements in the Federal Acquisition Regulations (FAR) that limit utility service contracts to 10 years, and recommend that USAF depreciate capital investments over the useful life of the item, rather than over the remaining life of the contract, to lower the amortization payments reflected in the rates.

Enron Federal Solutions, Inc. EFSI indicates that a firm fixed-price arrangement will best serve the interests of USAF and the utility provider. It notes that a firm fixed-price structure will require flexibility to modify the price at the request of either party.

Entex. Entex indicates that it would design rates to recover the cost of service under normal conditions while equitably assigning those costs so that no class subsidizes service

for another class. Entex rates typically include a monthly customer charge plus a commodity charge for the gas used.

Philip Utilities Management Corporation. The letter of interest by Philip Utilities does not address rate issues.

Texas-New Mexico Power Company. TNMP recommends separate accounting and pricing for unbundled electric utility services such as investment, operation, and maintenance of distribution systems. The company has unbundled the prices of its bundled services, on an average cost basis, as a first step toward alternate pricing and offering customer choice. TNMP states that the firm's project code accounting system could specifically assign costs for new distribution service to more closely tailor price to cost. This unbundled approach would provide USAF with service prices specific to its costs using cost-of-service ratemaking currently required by regulators. TNMP suggests that it could file tariffs specifically designed for military installations to meet the needs of unbundled service requirements.

U.S. Filter/Culligan Operating Services, Inc. and Morrison Knudsen Corporation. U.S. Filter-MK indicates that rates for the various utilities would be negotiated between USAF and the U.S. Filter-MK team, and would be established on a direct cost-of-service basis. Costs would be detailed in an annual report to USAF and negotiated annually based on actual expenses and an agreed-upon margin. USAF would also have input in decisions involving potential expansion of utility service operations beyond the base boundaries.

West Texas Gas, Inc. WTG proposes that new natural gas rates be developed for each base distribution system or combination of systems. The rate per MCF would reflect WTG's actual cost of gas plus the cost of service. WTG would adjust its rate calculations at 2- to 3-year intervals and make its calculations available to the Base Commander's office for audit and reasonableness checks.

2.4 Conjunctive Metering and Billing Options

This section provides the interested utility providers' proposed approaches to conjunctive metering and billing. Seven of the nine companies interested in Lackland AFB responded to this question, and five of the seven companies express a willingness to consider conjunctive metering and billing.

The following paragraphs describe the proposed conjunctive metering and billing options for Lackland AFB. These descriptions are summarized from the letters of interest.

2.4.1 Publicly Owned Utility Companies

City Public Service of San Antonio. The letter of interest by CPS does not address conjunctive metering / billing options.

San Antonio Water System. SAWS proposes to begin a program of conjunctive metering and billing and to increase the extent of water supply metering at each base. Each water supply well and each line from a storage facility would be metered, and each connection would be individually metered. This increased metering would be intended to help USAF quantify water usage for base franchise operations and review water consumption by other base facilities to facilitate water conservation.

2.4.2 Privately Owned Utility Companies

AquaSource. AquaSource indicates that it does not understand the significance of conjunctive metering at the bases. It anticipates that USAF would purchase commodities from suppliers according to existing contracts, and those purchases would be made at the Base fenceline. The private operator would be responsible for owning, operating and maintaining the on-Base distribution facilities. AquaSource proposes metering and billing base facilities according to the contractual relationships between USAF and its tenants.

Enron Federal Solutions, Inc. EFSI can and has structured conjunctive metering and billing agreements with customers. It believes the feasibility and effectiveness of such services should be examined on a case-by-case basis. EFSI recommends examining this issue with USAF as part of EFSI's due diligence process.

Entex. Entex states that it uses several metering and billing arrangements that could be tailored to Air Force needs.

Philip Utilities Management Corporation. The letter of interest by Philip Utilities does not address conjunctive metering/billing options.

Texas-New Mexico Power Company. TNMP states that its current tariffs for ancillary services for wholesale transactions would apply to a power sales agreement with military installations and could be tailored to meet a particular installation's requirements.

U.S. Filter/Culligan Operating Services, Inc. and Morrison Knudsen Corporation. U.S. Filter-MK indicates that the inherent differences between military installations and municipalities would require increasing the extent of metering on the bases. They propose increasing electric, natural gas, and water metering to quantify utility usage separately at all facilities not funded by normal base operating funds (e.g., NAF, AAFES, and tenants from other commands or services). Wastewater utility fees would be based on water usage.

Increased metering would also focus on high-use facilities to facilitate energy and water conservation; this would involve a cooperative effort between USAF and U.S. Filter-MK. U.S. Filter-MK proposes metering to quantify the water use of facilities from different funding sources to address the increasing importance of water conservation. They propose increasing metering over time to account for water use, water loss, and to conduct water use audits as warranted.

U.S. Filter-MK and USAF would determine billing procedures; U.S. Filter-MK proposes to consolidate billing to the extent that USAF desires.

West Texas Gas, Inc. WTG would contract for the meter reading, billing, and collection functions for all utilities except gas. WTG proposes using its customer information software system to consolidate the utility billing service to Base residents.

2.5 Conceptual Purchase Price

This section summarizes the interested utility providers' proposed approaches to determining conceptual purchase prices for the systems. Table 2.5-1 summarizes the approaches proposed by the respondents for Lackland AFB. As shown, there is a wide range of concepts suggested by the respondents. Some companies proposed more than one option. Most of the companies' responses indicated flexibility in how a purchase price should be determined.

The following paragraphs describe the proposed conceptual purchase price options for Lackland AFB. These descriptions are summarized from the letters of interest.

2.5.1 Publicly Owned Utility Companies

City Public Service of San Antonio. CPS proposes that the purchase price for the electric and natural gas utilities be based on the depreciated original cost of the facilities, minus costs needed immediately to bring the facilities up to specifications. CPS suggests that the total monthly utility bills for gas and electric service could be partially offset by payments or credits from CPS based on the purchase price. CPS also suggests that the bases should consider using the electric utility purchase price as a credit against capital improvements or upgrades.

San Antonio Water System. SAWS would evaluate the current condition of each system at each base, calculate the number of connections, and develop a purchase price based on the system assets and customers. SAWS would also offer to purchase Edwards Aquifer groundwater rights if those rights are included in the privatization of the water utilities.

2.5.2 Privately Owned Utility Companies

AquaSource. AquaSource proposes to purchase the utility assets for a nominal amount that would enable USAF to avoid depreciation and the contractor's return on the net undepreciated investment. This would result in lower service rates. Alternatively, AquaSource could make a higher initial payment for the facilities, based on fair market value; however, that payment and the cost of required future upgrades and repairs would be recovered through service rates.

Enron Federal Solutions, Inc. EFSI proposes a fair market value (FMV) approach for purchasing the utility assets. FMV would be determined as follows: (1) derive the value of total replacement of the systems; (2) estimate the current accumulated depreciation given

TABLE 2.5-1
Proposed Approaches to Determining Conceptual Purchase Prices
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

Utility Provider	Proposed Conceptual Purchase Price Approach				
	Nominal Price	Original Cost Less Depreciation	Replacement Cost New Less Depreciation	Capitalized Earnings Value	Unspecified or Other
Publicly Owned Utility Companies					
City Public Service of San Antonio		X			
San Antonio Water System					X
Privately Owned Utility Companies					
AquaSource	X				X
Enron			X		
Entex	X	X	X	X	X
Philip Utilities	X				X
Texas-New Mexico Power Company				X	X
U.S. Filter-Morrison Knudsen			X		
West Texas Gas		X	X	X	
TOTAL	**4**	**3**	**4**	**3**	**5**

system / asset age; and (3) estimate the capital investment required to upgrade the systems to meet code requirements.

Entex. Entex indicates that it would consider a variety of methods for determining the value of the natural gas system at Lackland AFB. Entex anticipates that the key factors in plant valuation will be physical condition, safety and environmental compliance, system throughput, and protective covenants related to curtailment or discontinuation of base operation. The company suggests providing potential bidders with detailed information about the existing systems to use in developing a proposed purchase price.

Philip Utilities Management Corporation. Philip Utilities indicates that it is willing to structure the purchase price to fit USAF's requirements. The company notes that a relatively high purchase price will result in higher rates, and a relatively low purchase price will result in lower rates.

Texas-New Mexico Power Company. TNMP indicates that the purchase price would depend primarily on the forecasted net cash flow, discounted at TNMP's weighted

average cost of capital. Other considerations would include impacts on the company's other customers and on TNMP's strategic goals for expansion or for providing additional services. The purchase price would be calculated independently for each base.

U.S. Filter/Culligan Operating Services, Inc. and Morrison Knudsen Corporation. U.S. Filter-MK proposes to purchase the utility assets on a replacement-cost-new-less-depreciation (RCNLD) basis, with the cost of required upgrades and repairs to be deducted from the purchase price or reflected in the negotiated rates. They would perform an assessment of the utilities based on inventories provided by USAF and negotiate the purchase price based on the assessment, including negotiation of any discrepancies between the inventories and the assessment.

West Texas Gas, Inc. WTG indicates that the purchase price could be arrived at in several different ways, including capitalized earnings values, RCNLD, original book value, or fair market appraisal based on values used for property tax assessments.

2.6 Market Analysis Conclusions

The overall conclusions of the market analysis for Lackland AFB follow:

- Nine companies expressed interest in purchasing one or more of the utilities at Lackland AFB, and there are at least five interested respondents for each utility. Considerable competition for Lackland AFB utilities is therefore likely.
- The existing service providers—CPS (electric and gas) and SAWS (water and wastewater)—both expressed interest in acquiring utility systems at Lackland AFB.
- Respondents demonstrated interest in a wide range of bundling options, ranging from a single utility at a single base to all utilities at all bases. Two interested providers for Lackland AFB (SAWS and Entex) indicate that they would prefer to bundle the Lackland utilities with the other two San Antonio-area bases (Brooks and Randolph); the other interested providers propose to bundle the Lackland utilities with at least five other bases. None of the companies expressed interest solely in Lackland AFB.
- The existing service providers (CPS and SAWS) express differing interests in using existing rate schedules. CPS indicates that it would propose a custom rate for on-Base service; SAWS indicates that it would propose to use its existing water and sewer rates for end users.
- Companies not currently providing service to Lackland AFB propose developing new rates for on-Base service.
- Seven of the nine companies interested in Lackland AFB utilities address conjunctive metering or billing in their responses; five of the seven companies express a willingness to consider conjunctive metering and billing.

The nine interested companies provide some discussion of purchase price options. Some companies propose more than one option, and most of the companies' responses indicate flexibility in how a purchase price should be determined.

3.0 Operational Impact Analysis

The operational impact analysis at Lackland AFB indicates that, with control measures, all operational risks of utility privatization are within the Air Force risk tolerance. These risks therefore do not prohibit privatization. The approach taken to evaluate the potential impacts of utility privatization is discussed in Section 1.3. Key to this analysis was the determination of risks and measures to mitigate those risks. Following are the specific findings of the operational impact analysis at Lackland AFB.

The results of the assessment at Lackland AFB suggest privatization of the Base electric and water distribution systems poses high risks at the AIA facility, and privatization at the Total Energy Plan (TEP) poses high risk at Wilford Hall. This could make privatization of these systems infeasible.

3.1 Identification and Assessment of Risks

Risks were grouped into the following categories so that they could be evaluated and managed in groups. For a more detailed documentation of the workshop results is provided in Volume II, Section 3.0, Appendix D.

1. **Slower response time to power outages in critical areas increases risk of an accident and mission degradation**. Slower response time to power outages in Wilford Hall and AIA facility causes a loss of life at the hospital and compromises national security in AIA facility. Backup systems are not adequate. Slower response times in these critical areas would result in a catastrophic mission failure.

2. **Decrease in the quality of power and water in critical areas increases risk of an accident and mission degradation**. The hospital is more dependent on purity of power and water than newer city hospitals that depend on private sector power and water. Variations could cause severe injury or death. Impure power quality compromises the AIA facility mission and would result in a national security risk. Backup systems are not designed for continued use and therefore would not adequately address the issue.

3. **Decrease in the reliability of power and water in critical areas increases risk of an accident and mission degradation**. Same rationale applies as for Risks 1 and 2.

4. **Decrease in the ownership and control of the system leads to increased legal and environmental liability**. The contractor might own and operate the system to a low standard but the Air Force might still retain some liability.

5. **Privatization leads to loss of jobs**. Air Force personnel risk losing their jobs when privatization occurs.

6. **Increasing the number of contractors on Base decreases security and increases the risk of an attack on the system**. The more contractors on Base, the more likely a mishap would occur. The Base treats its own water and thus opens itself to attack by privatizing.

7. **Possible operator default increases the risk of a system shutdown in the future**. Many factors could result in the new owner defaulting on the contract–market fluctuations, financial unsuitability, labor problems (strike). The result might be a shutdown of the utility system.

The results of the preliminary assessment are summarized in Table 3.1-1.

TABLE 3.1-1
Preliminary Risk Evaluation
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

Risk	Severity	Probability	Risk
Increased response time to power outages in critical areas increases risk of an accident and mission degradation.	Catastrophic/ Critical	Frequent	High
Decrease in the quality of power and water in critical areas increases risk of an accident and mission degradation.	Critical	Frequent	High
Decrease in the reliability of power and water in critical areas increases risk of an accident and mission degradation.	Critical/ Catastrophic	Frequent	High
Decrease in the ownership and control of the system leads to increased legal and environmental liability.	Marginal	Likely/ Occasional	Medium
Privatization leads to the loss of jobs.	Marginal	Frequent	Medium
Increasing the number of contractors on Base decreases security and increases the risk of an attack on the system.	Critical	Likely/ Occasional	High/ Medium
Possible operator default increases the risk of a system shutdown.	Critical	Likely/ Occasional	High/ Medium

Slower response time to power outages, lower quality of water and power supply and less power reliability were judged to be the highest risks if left unmitigated.

3.2 Identification and Evaluation of Mitigation Control Measures

The following is a compilation of the control measures identified in the workshops at all bases. All control measures may not be applicable or determined to be economically feasible at all bases. See Volume II, Section 3.0, Appendix D for a list of the specific control measures identified at the Base.

- **General**

– Require Air Force approval of subcontractors.

– Require operator personnel to participate in training exercises.

- **Ensure Adequate Level of Service**

– Require owner to operate from an on-base facility (mostly for electric systems).

  – Provide a direct Air Force to operator communication via a centralized utility service call for all utilities.

  – Include performance standards in the service agreement (such as maximum response times, purity of power, water quality). The Air Force has specified use of the response time requirements developed for Maxwell AFB as guidelines for this Feasibility Analysis; these are included in Volume II, Section 3.0.

  – Include performance incentives and/or penalties in contracts (financial penalties if possible).

– Require the Base be a service priority over an operator's other systems.

  – Add additional emergency generators where operator's reliability is not certain and need is critical.

– Allow for QAE oversight of operator.

  – Ensure that Base is a high priority for the operator (This might have an uncertain effect depending on the provider's other customers [e.g., hospital, city]).

- **Guard Against Default**

  – Require stringent documentation of past performance, background, and financial capability.

  – Include contract language to authorize the Air Force to operate and/or maintain the system in the event of a system shutdown, degradation, or national emergency. Include a release of liability.

– Include a no-strike clause in the contract.

- **Limit Air Force Liability**
  - Add contract provisions to limit Air Force environmental liability due to operator negligence.
  - Establish an environmental baseline to help limit Air Force liability.
  - Transfer applicable environmental permits to operator.
  - Require environmental audits and plans.
  - Require approval of an O&M plan for the purchased system.
  - Establish a memorandum of agreement (MOA) with the state to legally site and fine the operator in case of violation.
- **Minimize Job Loss Impact**
  - Institute RIF planning, right of first refusal, PPPs, employee buyout / early retirement.
- **Minimize Security Risk**
  - Require background checks and security badges for operator's on-Base personnel.
  - Provide safety and procedural training of operator's on-Base personnel.
  - Limit contractor access or provide escorts in controlled areas.

Based on the expected effect of all the control measures, the workshop team re-evaluated the risks using the sample risk matrix. The re-evaluation assumed that the control measures are taken, but did not assume they are necessarily successful. The objective was to estimate the effectiveness of taking available control measures.

The results of the re-assessment are shown in Table 3.2-1 and are documented in more detail in Volume II, Section 3.0, Appendix D.

TABLE 3.2-1
Risk Evaluation with Control Measures
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

Risk	Severity	Probability [a]	Risk [a]
Increased response time to power outages in critical areas increases risk of an accident and mission degradation	Catastrophic/ Critical	*Likely*	High
Decrease in the quality of power and water in critical areas increases risk of an accident and mission degradation.	Critical	*Likely*	High

TABLE 3.2-1
Risk Evaluation with Control Measures
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

Risk	Severity	Probability [a]	Risk [a]
Decrease in the reliability of power and water in critical areas increases risk of an accident and mission degradation	Critical/ Catastrophic	*Likely*	High
Decrease in the ownership and control of the system leads to increased legal and environmental liability.	Marginal	*Occasional*	Medium
Privatization leads to the loss of jobs.	Marginal	Frequent	Medium
Increasing the number of contractors on Base decreases security and increases the risk of an attack on the system.	Critical	*Occasional*	*Medium*
Possible operator default increases the risk of a system shutdown.	Critical	*Occasional*	*Medium*

a Italicized items denote changes from initial assessment without control measures.

The results show that, with control measures, privatization of the electrical and water systems and the TEP should be considered high risk. Decisionmakers at the appropriate level will choose the appropriate controls based on the analysis of overall costs and benefits. When the costs outweigh the benefits, some risk might be accepted. Ultimately, the control measures implemented in the real estate instruments and utility service contract will be reflected in the contract cost and the determination of the privatization project's economic viability.

Privatization hazards not related to the listed severity categories were also discussed at the workshops (Volume II, Section 3.0, Appendix E). These issues and impacts will be addressed in other steps of the privatization assessment.

3.3 Conclusions

Most major Base functions were present at the workshop (Volume II, Section 3.0, Appendix C). The hospital and AIA facility staffs were most vocal and led most of the discussion and direction of the group. These staff indicated that poor response time, quality, and reliability of the power and water systems would remain a high category risk even with aggressive control measures taken. The assessment of these risks is driven by the special needs of Wilford Hall and the AIA facility. These risks might be above the Air Force tolerance for privatization risk.

Without any control measures in place, two additional risks fell within the medium to high risk category: 1) the security risks around the AIA facility and 2) the potential for the

operator to default. The group's opinion was that, with the addition of adequate security provisions and initial operator screening, these risks would be reduced to an overall classification of medium.

The primary control measures needed to mitigate the highest risks included the following:

- Require owner to operate from an on-Base facility.
- Include performance standards in the service agreement (maximum response times, purity of power, water quality).
- Include performance incentives and/or penalties in contracts (financial if possible).
- Require stringent documentation of past performance, background, and financial capability.

Based on the results of the workshop, it was uncertain whether separating Wilford Hall and the AIA facility is feasible or would significantly mitigate the high risks. Because OSD guidance states that only SAF/MII has the authority to remove systems from the study, the workshop did not evaluate these possible omissions. Subsequent meetings with Wilford Hall and AIA personnel indicated that control measures, including significant contractual requirements, might reduce risks. Finally, senior leadership at the base decided that privatization of the electric and water systems was within the Base's risk tolerance.

Because the conversation focused on the TEP, electrical, and water systems, it was concluded that privatization of the gas and wastewater system would not result in a high risk in any of the areas (e.g., response time, quality, reliability). Although these utilities were not explicitly evaluated, participants suggested risks associated with the gas and wastewater systems would be within the Air Force tolerance for privatization risk.

4.0 Regulatory Overview

This section presents an overview of regulatory issues with respect to utilities privatization at Lackland Air Force bases in Texas. The discussion addresses:

- State and municipal regulation of utilities in Texas (Section 4.1).
- The potential effect of the "federal enclave" doctrine on utilities privatization within Air Force bases (Section 4.2).
- A summary of findings with respect to Lackland AFB (Section 4.3).

Conclusions regarding the individual utilities at Lackland AFB are presented in the utility-specific sections of this report (Sections 5.0 through 9.0).

This overview summarizes the results of research and analysis performed by Davidson & Troilo, P.C.; their detailed report for all seven TRD bases is presented in Volume II, Section 4.0. This information is based on current applicable legal authorities; however, future court decisions, legislation, and other relevant developments may change this information and affect utilities privatization in Texas.

4.1 Utility Regulation in Texas

The utilities proposed for privatization are regulated by three different state agencies:

- Electricity: Public Utility Commission of Texas (PUCT)
- Water and wastewater: Texas Natural Resource Conservation Commission (TNRCC)[4]
- Natural gas: Railroad Commission (RRC)

Municipalities also hold regulatory authority over utilities offering service within their corporate limits, but this jurisdiction is limited and may be subject to review by the appropriate state regulatory agency.

The following subsections describe the state and municipal regulatory framework for each utility.

4.1.1 Electricity

Jurisdiction

The PUCT and local municipalities regulate electric utilities pursuant to Title II, Subtitles A and B, of the Texas Utilities Code. Some municipalities have regulatory jurisdiction

[4] The TNRCC regulates the provision of potable water service, so chilled water or steam systems are not subject to TNRCC regulation.

within their municipal limits; the PUCT has jurisdiction outside a municipality's limits. Regulatory authority therefore varies depending on whether a particular base or portion of a base is located within municipal limits. This issue is further affected by the federal enclave doctrine, discussed below in Section 4.2.

Regulatory jurisdiction also depends on the nature of the utility service provider. The PUCT regulates investor-owned utilities. Electrical cooperatives may remove themselves from PUCT jurisdiction, but may in some cases be subject to PUCT rate regulation (see "Rate Regulation," below). Municipally owned utilities are not subject to PUCT regulation, but also may in some cases be subject to PUCT rate regulation (see "Rate Regulation"). Wholesale providers are exempt from PUCT regulation.

The PUCT recently decided that three U.S. Naval stations are eligible to change their customer status from retail to wholesale.[5] In an order signed on February 2, 1999, the commissioners concluded that the Navy met the threshold requirements for classification as a wholesale customer because it exhibits the attributes of a wholesale purchaser of electricity. Although not required by commission practice, the commissioners heard several motions to reconsider the February 2 order at their March 11 open meeting. After a brief discussion of the issues, the commissioners rejected all of the arguments presented except for a partial change concerning the definition of sales. In the original order, intra-Navy transfers were considered to be sales. Upon reconsideration, the commissioners clarified that sales do not include transfers between Navy units. A minor evidentiary error also was corrected. All other points for reconsideration were denied. Consequently, the March 16th order on reconsideration does not change the underlying reasoning of the original order. Other questions and the impact of the order in Phase One will be considered in the Phase Two proceeding before the State Office of Administrative Hearings.

In 1999, Texas enacted electric utility deregulation legislation (Texas Utilities Code Section 32.060). Among its components, the legislation provides some restriction to shifting the status of customers from retail to wholesale. Specifically, the PUCT is prevented from converting a retail customer into a wholesale customer in areas served by a municipal electric utility that does not allow its retail customers access to other power supplies. As described in Section 2.0, Lackland AFB currently purchases its power supply from CPS, a municipal utility. As a result, Lackland may be restricted from purchasing power in wholesale markets until CPS decides to offer such access. (A memorandum by John Laakso on the Texas deregulation legislation is provided in Volume II, Section 4.0.)

However, if Lackland were to privatize its electric utility system, it may be able to obtain access to wholesale markets by forming a strategic partnership with the new owner of its electric system. If that new owner could qualify as an electric utility, it would have access

[5] PUCT Docket No. 17180, filed March 11, 1997.

to wholesale markets. The new owner could then effectively act as the Base's agent in obtaining wholesale power supplies in competitive markets.

Service Areas

In order to provide electrical service to a particular geographic area, an electric utility must obtain a certificate of convenience and necessity (CCN) for that area from the PUCT. The PUCT will grant a CCN if it is necessary for the service, convenience, accommodation, service or safety of the public. The PUCT can consider many factors in deciding whether to grant a CCN, such as the utility's ability to provide service, the adequacy of existing service, the need for additional service, impact on other utilities, environmental concerns, service improvement, and reduced cost to consumers. As part of obtaining a CCN, a retail electric utility must also acquire all franchises or other permits from municipalities or other public authorities.

The Texas constitution does not allow the state to create monopolies. Accordingly, exclusive CCNs are not allowed in Texas. Therefore, a CCN does not create an exclusive right to serve the area; other utilities or even non-utilities can request and obtain a CCN in an area already receiving service. Two or more CCN holders can compete for retail customers within the same certificated area. CCN maps and county files indicate that all seven TRDP bases are within the certificated territories of existing electric utilities. Regulatory jurisdiction will have to be decided on a case-by-case basis.

The intent of this general constitutional rule has been contraverted by electric utility deregulation legislation mentioned above (Texas Utilities Code Section 32.060). This legislation provides that for the period September 1, 1999, through January 1, 2002, the PUCT is restricted from granting new CCNs in existing service areas under most circumstances. Under these circumstances, the legislation creates a de facto monopoly for utilities in areas where they hold the only existing CCN. This legislative restriction is extended indefinitely for the service areas of municipally owned utilities that choose not to offer their customers access to other power supplies when allowed by the deregulation legislation beginning on January 1, 2002.

However, as described in the John Laakso memorandum included in Volume II, Section 4.0, Texas Utilities Code Section 32.060 does not restrict the PUCT from granting CCNs at Air Force bases in Texas. This is because maintenance of an exclusive CCN requires an ability of the CCN holder to serve the area in question. Since the existing CCN holder would not have access to the base, it would not be able to demonstrate this ability. Accordingly, the successful bidder for the Air Force electric utility system would be able to demonstrate an ability to serve and would likely be awarded a CCN for the base.

Rate Regulation

The PUCT regulates different types of electric utilities to different degrees depending on the utility's ownership status and type of activity. The PUCT reviews investor-owned

utility rates under a full cost-of-service standard, and their rates are normally set through a formal procedure that requires a notice of intent to change rates, filing a rate package, and an opportunity for a hearing. Cooperatives have discretion as to how they will handle rate regulation. A cooperative may remove itself from PUCT jurisdiction, but is still subject to filing rate tariffs. In addition, the PUCT may review a cooperative's rates if cooperative members or an affected electric utility file a complaint, or if the cooperative is collecting excessive revenues. Municipally owned utility rates are reviewed by the PUCT only if there is an appeal by ratepayers who do not reside within the municipality's boundaries. Wholesale providers are exempted from PUCT rate regulation.

A regulated electric utility provider cannot charge a rate that has not been filed as a tariff with the PUCT. However, the extensive rate regulation procedures apply to rate changes. Thus, new rates would have to be filed as tariffs, but not necessarily reviewed before the new owner began operating the system.

Custom rates may be established if there is a reasonable basis to do so. The PUCT has approved custom rates many times when the parties have agreed on the rates.

Sales Price

Electric utilities that are regulated by the PUCT are required to report a system purchase to the PUCT. The PUCT does not have authority to prohibit a sale, but may find that the transaction is not consistent with the public interest. In this case, the PUCT will take the effect of the transaction into consideration in the next ratemaking proceeding and disallow any unreasonable impacts on rates or service.

When the PUCT sets rates, it must establish the original cost of invested capital. Rates must be based on original cost less depreciation. The PUCT is reluctant to include payments above actual cost unless there is good cause to do so. The concept used to analyze inclusion of a premium payment is referred to as "acquisition adjustment." The PUCT will determine whether the purchase price was excessive and then consider if there are offsetting benefits accruing to ratepayers. If an acquisition adjustment is allowed, it will be recovered by amortizing the amount over the life of the plant purchased.

Service Standards and Design/Operational Requirements

The PUCT has established performance standards and incorporated standards adopted by the utilities. Because the PUCT has broad authority, it can investigate specific safety or other system configuration issues if they arise.

The PUCT rules generally govern typical electric utility practices related to customer relations, new service, deposits, billing, meters, and discontinuance of service. The PUCT has not adopted rules to protect electric customers from abusive competitive practices, but will do so as retail competition develops. Because of recent outages and reduced services due to increased competition and merger activity, the PUCT recently adopted new quality

of service operation rules such as new standards for an emergency operation plan and system-wide and distribution feeder reliability.

Metering Options

There appear to be several metering options that would be acceptable to the PUCT. The Air Force and the owner of the privatized electric distribution system might negotiate a service arrangement under which any of the following options are likely to be acceptable to the PUCT:

1. Standard Metering. This would consist of metering electric usage at each facility on Base. Normally, this would imply that the rate charged for distribution service on Base would be based on kilowatt (kW) demand and kilowatt-hour (kWh) usage. Reasons for seeking this option include:

   - Electric rates are normally based largely on kW demand and kWh usage at the point of service delivery. Given its traditional industry practice, the PUCT would accept such a metering option and likely accept the associated rate structure.
   - Such metering would provide incentive for the distribution system owner to reduce losses on the system. This in turn would reduce the Air Force's cost of power supply.
   - Metered data for individual facilities would be useful to the Base's energy management program.

   Reasons for not seeking this option include:

   - Metering is an extra expense that would naturally be borne by the Air Force.
   - The cost of owning, operating, and maintaining an electric distribution system is largely fixed and therefore does not vary according to electrical usage. Given the possibility that electrical usage will change with time, this creates a potential disconnect between the utility's costs and revenues if rates are based on kWh usage. This disconnect increases risk for both the owner and the Air Force. The owner will include consideration of this risk in its rates to the Air Force, thereby increasing the Air Force's cost.

2. Master Metering. This would consist of metering the base's overall usage and submetering individual facility uses only as necessary to meet the Air Force's need for data. Normally this would imply that the rates charged would be a fixed monthly rate. On the other hand, it could also include a rate based on kW demand and kWh usage. This would be the same as the emerging practice of "conjunctive billing" whereby the uses at individual facilities are aggregated into a total amount and billed as a single use. Master metering is an accepted practice for apartment buildings in Texas and is regulated by the PUCT and state statute. In addition, there is PUCT precedent for acceptance of conjunctive billing. Taken together, it appears that master

metering and conjunctive billing would be an option for privatized electric distribution service to the Base. Reasons for seeking this option include:

- The Air Force could avoid the cost of adding meters to the distribution system.
- The Air Force might get a rate break from conjunctive billing.

Reasons for not seeking this option include:

- As noted above, the cost of owning, operating, and maintaining an electric distribution system is largely fixed and therefore does not vary according to electrical usage. It is assumed that a master metered arrangement would be based on a rate charged against electrical usage. This would create extra risk and costs for the Air Force as noted above.
- The incentive for the owner to reduce losses would be less than if end uses were metered. However, some incentives based on loss surveys could be built into the contract with the new owner.

3. No Metering. Given that the cost of owning, operating, and maintaining an electric distribution system is fixed, it would be logical to establish a rate based on these fixed costs. A fixed monthly rate for on-Base distribution service would not require metered usage data. (The Air Force might meter some uses for its own purposes.) Based on discussion with the PUCT, it is likely that this option would be acceptable to the PUCT assuming that the arrangement would not affect parties other than the new owner and the Air Force. Reasons for seeking this option include:

   - The Air Force could avoid the cost of adding meters to the distribution system.
   - The new owner of the distribution system would not have the risk that losses would likely develop if electric loads on the system were to be reduced in the future. Likewise, the Air Force would not have the risk that costs would increase with increased loads in the future. These risk reductions would result in lower costs to the Air Force.

   A reason for not seeking this option is as follows:

   - The incentive for the owner to reduce losses would be less than if end uses were metered. However, some incentives based on loss surveys could be built into the contract with the new owner.

4.1.2 Water and Wastewater

Jurisdiction

The TNRCC regulates the services, rates, design, and operation of water and sewer utilities. The extent to which the TNRCC regulates a water or wastewater utility depends upon the nature of the utility's ownership. Investor-owned utilities are extensively

regulated; a member-owned system is subject to somewhat less regulation; and a publicly owned system is subject to limited jurisdiction. However, the TNRCC design and operational standards apply regardless of the nature of the utility's ownership.

Regulatory jurisdiction also depends on whether the purchaser is currently regulated, and the extent to which the federal enclave doctrine applies (see Section 4.2, below). If an existing investor-owned utility purchased the system, the TNRCC would regulate the utility's rates and service. A newly formed investor-owned utility or a non-regulated subsidiary of an existing regulated utility, however, may not be subject to regulation if the federal government retains exclusive jurisdiction over the utility system assets (Section 4.2).

Service Areas

The TNRCC regulates the service areas of all water and wastewater utilities by the issuance of a CCN. Municipalities do not regulate water/wastewater service areas.

A publicly owned utility is not required to obtain a CCN unless another water/wastewater utility holds a CCN for the area or is already actually serving the area. A utility regulated by the TNRCC must obtain a CCN prior to initiating service within an area unless: (1) it serves less than 15 potential connections and is not within the certificated area of another utility; or (2) its service will extend less than a quarter-mile into contiguous territory not within the service area of another utility. Under the 15-connections rule, an investor-owned utility could argue that an Air Force base is one connection, regardless of the number of on-base buildings served, and if the utility's system had less than 14 other connections it could qualify for CCN exemption.

Despite CCN regulations preventing dual certification of water/wastewater service areas, a utility could likely obtain a CCN for an Air Force base that is within another utility's certificated area. If the existing utility opposed the CCN application, both utilities would have to prove their respective abilities to serve the areas. The existing utility would have to demonstrate its ability to extend its system onto land owned and controlled by the Air Force; this would be difficult, if not impossible. On the other hand, the utility purchasing the Air Force system would be able to demonstrate that it owns, or has access to, the base utility distribution system; this would enable the utility to satisfy its obligations under the CCN. Utilities may also agree on service areas and customers, but such agreements must be approved by the TNRCC.

Texas water/wastewater CCN maps indicate that the TRDP bases differ with respect to proximity to CCN areas. Service area regulatory jurisdiction will have to be decided on a case-by-case basis.

Rates and Sales Price

The TNRCC regulates water and sewer rates in Texas, with the following limitations:

1. Rates charged by publicly owned and member-owned utilities are self regulated. TNRCC regulation is limited to responding to issues raised when a requisite number of affected customers file a complaint.

2. Within city limits, original jurisdiction for rates charged by investor-owned utilities resides with the municipal government. However, all parties, including the utility service provider, have the right to appeal rate decisions by municipalities to the TNRCC.

The TNRCC generally regulates the sale or lease of utility facilities by requiring prior notice and opportunity for review and approval; however, because the Air Force is not required to hold a CCN, the TNRCC will not have to approve the sale of the system.

If the purchaser is an investor-owned utility, the TNRCC would add the system assets to the utility's rate base at the original cost less depreciation; if the Air Force does not have this information, the original cost would be developed by trending. The TNRCC may also allow an acquisition adjustment. If the purchaser is a publicly owned or member-owned utility, the TNRCC does not review the rate. Most publicly owned utilities are on a cash basis for accounting, so the value of the rate base is not as critical as the method of financing. The law prohibits preferential rates, but an opportunity still is present to develop a rate for the Air Force if based upon reasonable distinctions.

Service Standards and Design/Operational Requirements

The TNRCC or a municipality may set service standards applicable to investor-owned utilities. Water and wastewater systems, regardless of the nature of ownership, must satisfy the minimum design and operational requirements set by the TNRCC.

Metering Options

The TNRCC typically requires a meter for each service connection, but might grant exceptions to this rule if the exception does not compromise health, service, or water quality. For water service, the TNRCC appears willing to allow any of the three metering options outlined above for electric distribution service (metering at each facility, master metering, or no metering). For wastewater service, the TNRCC normally encourages, but does not require, billing based upon metered water usage. For an on-Base collection system, it would likely allow billing based on water usage at each facility, master metering (like that currently in place for wastewater discharge from the Base), or rates based on a single monthly charge without reference to metered usage.

Discharge Permits

The TNRCC is responsible for issuing both federal and state permits for wastewater treatment facilities, and may designate a regional wastewater provider for an area that encompasses multiple water supply CCNs. The TNRCC may require any wastewater utility to discharge to the regional system.

4.1.3 Natural Gas

Jurisdiction

The RRC regulates gas utilities pursuant to the laws in Titles 3 and 4 of the Texas Utilities Code. The RRC regulates investor-owned utilities that distribute natural gas outside a municipality; it does not regulate or supervise rates or services by a municipally owned utility. A member-owned, non-profit corporation would be regulated in the same manner as an investor-owned utility.

Service Areas

Unlike electric and water/wastewater utilities, the RRC does not regulate gas service areas. Since the state has not preempted local authority to designate service areas, a municipality may retain some authority to authorize service within its corporate limits. If a city operates its own gas distribution system, it could prohibit competing gas utilities from using its streets in order to provide service, but this power is limited within Air Force bases if the federal government, not the city, owns and controls the on-base streets. However, if the city has granted a franchise to a non-city-owned gas utility, the city cannot prevent another gas utility from using city streets because the city cannot grant an exclusive franchise or exclusive street-use rights to a single provider. The RRC's most recent annual report lists the gas utility serving each Texas city, and in no case were two utilities shown to be providing service within the same city.

Gas supplies are deregulated in Texas in that large customers can purchase gas from wholesale suppliers and have the gas delivered through the local distribution system.

Rates and Sales Price

The RRC may establish and set the rates of investor-owned and member-owned gas utilities. Publicly owned utilities are not subject to RRC rate regulation.

An investor-owned gas utility must file a rate schedule as a tariff with the RCC, and may not grant an unreasonable preference or advantage concerning rates or services to a customer in a particular classification. If a complaint is filed, the RCC determines whether the rate is in accordance with the filed tariff, and whether the rate is the same for similar customers.

The RRC must approve the acquisition of a plant as an operating unit or system for a total consideration of more than $200,000, or the merger or consolidation with another gas utility operating within the state. For rate-making purposes, the RRC would use the Air Force's original cost less depreciation, but will allow an acquisition adjustment when justified.

Service Standards and Design/Operational Requirements

The RRC is authorized to adopt standards regulating the quality of service. It has adopted service standards applicable to residential and small commercial customers, but does not

define the term "small commercial customer." The RRC has historically not inspected or regulated gas distribution lines or services within Air Force bases.

Metering Options

The discussion of this issue relative to electricity and water also applies to gas. That is, the RRC would likely allow billing for gas distribution on Base to be based on three metering options: metering of uses at individual facilities on Base, master metering, or no metering at all. For more discussion of these options, see the metering subsection under Section 4.1.1.

In addition to using meters as a billing method, the RCC uses meters as the major method of determining the integrity of the gas pipeline system. Without a method to account for gas deliveries, the RRC might require an alternative plan to routinely demonstrate the integrity and the safety of the gas pipeline.

4.2 The Federal Enclave Doctrine

The extent to which state regulatory authority may affect utilities privatization at a particular TRDP base depends upon:

- Whether the base is a federal enclave and the extent of exclusive federal jurisdiction; and
- Whether the state regulatory authority, or unsuccessful bidders, accept that state jurisdiction within the base is limited under the federal enclave doctrine.

The federal government may acquire jurisdiction over state land that it acquires, such as land used for military installations. If land is acquired with federal jurisdiction, the area becomes a "federal enclave." The state ceding jurisdiction to the federal government cannot exercise its jurisdiction over a federal enclave except as was reserved at the time the land was ceded, or as was rescinded by subsequent federal action. State or local laws that were in effect at the time the federal government acquired the property may continue in force if they are not inconsistent with federal law. The deed of cession controls the original character of the jurisdictional transfer. In Texas, the Government Code contains general provisions governing such a transfer.

The federal government may have exclusive, concurrent, or proprietary jurisdiction over a federal enclave:

- *Exclusive jurisdiction* applies when the federal government possesses all of the authority of the state, and the state has not reserved to itself the right to exercise any authority concurrently with the federal government other than the right to serve civil or criminal process in the federal enclave for actions that occurred outside the federal enclave.

- *Concurrent jurisdiction* applies when the state reserves to itself the right to exercise, concurrently with the federal government, all of the same authority.
- *Proprietary jurisdiction* applies when the federal government has acquired some right or title to an area in the state, but has not obtained any measure of the state's authority over the area.[6]

All three of these jurisdictional levels may be present on a single Air Force base. This situation can exist because the land was acquired at different times with different operative language or laws, or because of a partial recession of federal jurisdiction by deed or act of Congress. The nature of the jurisdiction at a particular Air Force base therefore must be established in detail.

Previous court cases involving the sale or regulation of utilities at military installations have addressed aspects of the federal enclave doctrine:

- The California Public Utility Commission concluded in 1997 that the sale of military land and gas utility assets at Mather Field, California terminated federal exclusive jurisdiction. However, the rescinded land and utility assets were not retroactively incorporated into a prior CCN issued to a utility provider for the entire county since the Commission had no power to grant a CCN for Mather Field at the time that the CCN was issued.
- In *Black Hills Power and Light Company v Weinberger* (1987), the Eighth Circuit Court concluded that a state commission could not regulate the sale of electricity within Ellsworth AFB (i.e., there was no concurrent federal and state jurisdiction with respect to utility regulation).
- Congress enacted legislation to prohibit federal agencies from purchasing electricity in a manner inconsistent with state law; however, the Eighth Circuit found that this legislation did not extend state jurisdiction to federal enclaves since Congress failed to specify "federal enclave."
- The manner in which an Air Force base's utilities are purchased may also affect regulatory jurisdiction. Payment may be received as a reduction in rates; however, any such rate reductions would be subject to state rate regulation.

The Black Hills decision and federal law suggest that state law may not have authority to regulate either the sales transaction or subsequent sale of electricity to areas of an Air Force base subject to exclusive federal jurisdiction. However, an Eighth Circuit decision does not bind Texas regulatory authorities or the Fifth Circuit, and while state regulation

[6] It should be recognized that the federal government, by virtue of various provisions of the Constitution, has many powers and immunities not possessed by ordinary landholders with respect to areas in which it acquires an interest. It should also be recognized that the federal government holds all of its properties and performs all of its functions in a governmental, rather than proprietarial, capacity.

may not reach activities of the Air Force, it is unclear as to whether a purchaser of a utility system will be also exempt from state jurisdiction.

Once the Air Force base utilities are acquired or operated by someone other than the federal government, each affected state regulatory authority will need to determine, probably on a case-by-case, basis, whether the federal enclave doctrine applies. A situation could occur in which the affected state agencies disagree on the applicability of the doctrine. The issue will ultimately need to be resolved by Congress, or by either the Texas Legislature or by a decision made or recognized by the Texas Supreme Court. Until resolved, prospective purchasers may not know precisely the extent to which state regulatory authorities can or will exercise jurisdiction. Each bid therefore should be analyzed on the assumption that some or all of the transaction might be subject to state regulation.

4.3 Regulatory Overview for Lackland AFB

Based on the findings of this regulatory analysis, all utilities proposed for privatization at Lackland AFB are open to competitive bidding.

Lackland AFB is not located within the corporate limits of San Antonio, according to the City's Planning Department, and does not appear to be located within any other city. All of Lackland AFB is shown to be subject to exclusive federal jurisdiction except a relatively small strip along the east side of Military Drive on the north end of the Main Base and the rail spur on the southwest edge of the Main Base; both of these areas are shown to be subject to proprietary jurisdiction. The Base also has the following relationships to existing utilities and service areas:

- Electric: the Base, including the Training Annex, is included within an electric CCN held by CPS (a municipally owned utility)
- Natural gas: the Base is not located within any city's corporate limits
- Water: the Base is not included within any CCN, but is surrounded by a CCN held by SAWS (a municipally owned utility)
- Wastewater: the Base is included within a sewer CCN held by SAWS
- TEP: not regulated (utilities providing non-potable water for heating and cooling purposes are not regulated unless city streets are used for the pipelines)

The regulatory implications of the Base's location with respect to existing CCNs and city corporate limits, as well as the implications of exclusive federal jurisdiction, differ for each utility and are discussed in Sections 5.0 through 9.0.

5.0 Electrical System Analysis

5.1 System Overview

5.1.1 Description

City Public Service of San Antonio (CPS) currently supplies electric power to the Lackland AFB Main Base and Training Annex through a total of four 13.8-kilovolt (kV) distribution circuits from the CPS Medina Substation.

Three feeders supply power to the Main Base through a switching station located on the east side of the Main Base. This station consists of four main incoming breakers (one is currently a spare), four ring bus tie breakers, and nine feeder breakers; these breakers are all rated at 15 kV, 1,200 amperes, 500 megavolt-amperes (MVA). The switching station feeds the Main Base through seven circuits (numbered 1 through 7) from the nine available feeder breakers. These circuits exit the switching station underground and have 500 thousand-circular-mil (MCM) copper cable for the underground getaway. The distribution circuits are multi-grounded, four-wire wye systems rated for 7.96/13.8 kV and operate at approximately 13.6 kV. The main distribution feeders of these circuits are generally 336 aluminum conductor steel reinforced (336 ACSR). All of the circuits have backfeed capabilities; each circuit is tied to at least one other circuit by means of a gang-operated switch. Two of the circuits (2 and 7) are dedicated as backups for Wilford Hall Medical Center.

One 13.8-kV distribution circuit from the CPS Medina Substation feeds the Training Annex through the Medina Annex switching station located on the east side of the Training Annex. This switching station consists of outdoor metal-clad gear with one incoming breaker and four outgoing breakers. The switching station feeds the Training Annex through four distribution circuits. Like the Main Base circuits, the Training Annex distribution circuits are multi-grounded, four-wire wye systems rated for 7.96/13.8 kV and operate at approximately 13.6 kV. These circuits exit the switching station underground but transition to overhead lines through riser poles outside the station; the distribution circuits are primarily overhead.

The overhead portions of the Main Base and Training Annex distribution systems total approximately 261,500 linear feet (lf) and the underground portions (in conduit) total approximately 41,300 lf. The systems also include:

- 216 three-phase transformers ranging from 30 to 1,500 kVA
- 706 single-phase transformers ranging from 5 to 250 kVA
- 1,831 utility poles

- 28 switches (3- and 6-way)
- 141 utility vaults
- 425 streetlight fixtures

Section 5.1.2 presents a detailed inventory of the Lackland AFB electrical system.

The underground circuits, vaults, three-phase transformers, and switches were constructed in the 1990s; the overhead circuits and single-phase transformers were constructed in the 1960s. The Main Base switching station was constructed in the 1990s and the Training Annex switching station in the 1980s. The systems at both the Main Base and the Training Annex are generally in good condition, although some minor improvements are needed in order to comply with current regulations and code requirements (see Section 5.6.1). The distribution system was upgraded in the early 1990s by replacing wood crossarms with narrow-profile assemblies and replacing much of the copper conductor with ACSR conductor.

A CPS-owned and -maintained distribution circuit that is not part of the Base distribution system crosses Lackland AFB from the Medina Substation and splits into north and south branches. There are no tie switches between this circuit and any of the Base's distribution circuits, and this circuit has only a few joint-use or shared structures with the Base distribution system.

5.1.2 Inventory and System Value

Table 5.1.2-1 presents an inventory of the electric utility system, together with estimated system value in terms of replacement costs and depreciation rates. The inventory is based on “take-off” calculations for the system components summarized above in Section 5.1.1. Section 1.3 describes the approach to these calculations. Unit costs for each line item were then estimated based on a combination of the sources listed in Section 1.3.6.

This system inventory yields a calculated RCN value of approximately $13,516,972 (see Table 5.1.2-1). Based on an estimate of installation dates and useful life for this type of equipment, the calculated RCNLD is approximately $7,237,665.

5.2 Utility Requirements Assessment

5.2.1 Current and Future Electrical Demand

Annual electric power consumption at Lackland AFB (Main Base and Training Annex combined) is approximately 164 million kilowatt-hours (kWh). The peak demand during FY98 was 29.8 megawatts (MW), occurring in June.

As noted in Section 1.2, key projects planned for Lackland AFB will increase the total square footage of buildings on Base by about 4 percent. Based on these plans, the capacity of the electric distribution system was evaluated based on a future peak requirement of 31 MW. Because of the ongoing energy conservation program at the Base, future peak

requirements will likely be less than this level. Therefore, the capacity analysis is conservative in that it was performed with a forecast that is on the high side of the range of likely growth in peak requirements.

TABLE 5.1.2-1
Electric Utility Inventory
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

Item	Size	Quantity	Unit	Approximate Year of Construction	Design Life (Years)	Estimated Unit Cost ($)	RCN ($)	RCNLD ($)	Cost to Remedy Current Deficiencies ($)	Depreciation Rate (%)	Weighted Depreciation Rate (%)
Substations											
Main		1	EA	1995	30	714,000	714,000	618,800	-	3.3%	0.2466%
Annex		1	EA	1985	30	136,000	136,000	72,533	-	3.3%	0.0470%
Underground Circuits	**AWG**	**Length (ft)**									
3ph, 4w, 15000V, in conduit	#2	9,545	LF	1995	50	19	180,804	166,340	-	2.0%	0.0375%
3ph, 4w, 15000V, in conduit	#1	7,873	LF	1995	50	21	164,017	150,896	-	2.0%	0.0340%
3ph, 4w, 15000V, in conduit	#1/0	3,660	LF	1995	50	21	78,316	72,051	-	2.0%	0.0162%
3ph, 4w, 15000V, in conduit	#2/0	1,960	LF	1995	50	24	46,399	42,687	-	2.0%	0.0096%
3ph, 4w, 15000V, in conduit	#4/0	2,140	LF	1995	50	25	53,851	49,542	-	2.0%	0.0112%
3ph, 4w, 15000V, in conduit	#250	560	LF	1995	50	30	16,970	15,612	-	2.0%	0.0035%
3ph, 4w, 15000V, in conduit	#350	1,465	LF	1995	50	35	51,336	47,229	-	2.0%	0.0106%
3ph, 4w, 15000V, in conduit	#500	10,440	LF	1995	50	40	415,207	381,991	-	2.0%	0.0861%
3ph, 4w, 15000V, in conduit	#750	3,700	LF	1995	50	53	196,190	180,495	-	2.0%	0.0407%
Overhead Circuits											
3 ph, 4 w, CU conductor	#750	670	LF	1965	35	61	40,604	1,160	-	2.9%	0.0120%
3 ph, 4 w, CU conductor	#1/0	3400	LF	1965	35	9	30,255	864	-	2.9%	0.0090%
3 ph, 4 w, CU conductor	#2/0	380	LF	1965	35	10	3,743	107	-	2.9%	0.0011%
3 ph, 4 w, CU conductor	#4/0	730	LF	1965	35	14	9,954	284	-	2.9%	0.0029%
3 ph, 4 w, CU conductor	#1	320	LF	1965	35	7	2,394	68	-	2.9%	0.0007%
3 ph, 4 w, CU conductor	#2	6770	LF	1965	35	6	41,021	1,172	-	2.9%	0.0121%
3 ph, 4 w, CU conductor	#4	35950	LF	1965	35	4	149,782	4,279	-	2.9%	0.0443%
3 ph, 4 w, CU conductor	#6	12330	LF	1965	35	3	39,703	1,134	-	2.9%	0.0118%
3 ph, 4 w, AL conductor	#336	84420	LF	1965	35	11	911,466	26,042	-	2.9%	0.2699%
3 ph, 4 w, AL conductor	#1/0	2350	LF	1965	35	6	14,239	407	-	2.9%	0.0042%
3 ph, 4 w, AL conductor	#4/0	9120	LF	1965	35	9	81,204	2,320	-	2.9%	0.0240%
3 ph, 4 w, AL conductor	#2	98600	LF	1965	35	4	410,807	11,737	-	2.9%	0.1216%
3 ph, 4 w, AL conductor	#4	6070	LF	1965	35	3	19,545	558	-	2.9%	0.0058%
3 ph, 4 w, AL conductor	#6	400	LF	1965	35	3	1,288	37	-	2.9%	0.0004%
Transformers	**Nom kVA**	**No.**									
3-Phase	30	5	EA	1995	35	1,200	6,000	5,314	-	2.9%	0.0018%
3-Phase	45	5	EA	1995	35	1,500	7,500	6,643	-	2.9%	0.0022%
3-Phase	75	12	EA	1995	35	1,500	18,000	15,943	-	2.9%	0.0053%
3-Phase	112.5	22	EA	1995	35	3,000	66,000	58,457	-	2.9%	0.0195%
3-Phase	150	25	EA	1995	35	3,000	75,000	66,429	-	2.9%	0.0222%
3-Phase	225	31	EA	1995	35	4,000	124,000	109,829	-	2.9%	0.0367%
3-Phase	300	24	EA	1995	35	4,000	96,000	85,029	-	2.9%	0.0284%
3-Phase	500	32	EA	1995	35	7,000	224,000	198,400	-	2.9%	0.0663%
3-Phase	750	44	EA	1995	35	10,000	440,000	389,714	-	2.9%	0.1303%
3-Phase	1000	8	EA	1995	35	15,000	120,000	106,286	-	2.9%	0.0355%
3-Phase	1500	8	EA	1995	35	20,000	160,000	141,714	-	2.9%	0.0474%
1-Phase	5	35	EA	1965	35	500	17,500	500	-	2.9%	0.0052%

1-Phase	10	50	EA	1965	35	500	25,000	714	-	2.9%	0.0074%
1-Phase	15	58	EA	1965	35	500	29,000	829	-	2.9%	0.0086%
1-Phase	25	133	EA	1965	35	500	66,500	1,900	-	2.9%	0.0197%
1-Phase	37.5	76	EA	1965	35	700	53,200	1,520	-	2.9%	0.0158%
1-Phase	50	233	EA	1965	35	700	163,100	4,660	-	2.9%	0.0483%
1-Phase	75	74	EA	1965	35	900	66,600	1,903	-	2.9%	0.0197%
1-Phase	100	35	EA	1965	35	1,100	38,500	1,100	-	2.9%	0.0114%
1-Phase	167	10	EA	1965	35	1,500	15,000	429	-	2.9%	0.0044%
1-Phase	250	2	EA	1965	35	1,900	3,800	109	-	2.9%	0.0011%
Utility Poles	**Height (ft)**	**No.**									
	25	1	EA	1965	35	635	635	18	-	2.9%	0.0002%
	30	93	EA	1965	35	697	64,863	1,853	-	2.9%	0.0192%
	35	198	EA	1965	35	756	149,747	4,278	-	2.9%	0.0443%
	40	826	EA	1965	35	822	679,137	19,404	-	2.9%	0.2011%
	45	612	EA	1965	35	897	548,933	15,684	-	2.9%	0.1625%
	Other	101	EA	1965	35	1,399	141,339	4,038	-	2.9%	0.0418%
Switches	**Type**	**No.**									
	3-Way	22	EA	1995	30	13,875	305,250	264,550	-	3.3%	0.1054%
	6-Way	6	EA	1995	30	19,980	119,880	103,896	-	3.3%	0.0414%
Vaults	**Type**	**No.**									
	Utility	141	EA	1995	50	12,614	1,778,574	1,636,288	-	2.0%	0.3686%
Lighting	**Type**	**No.**									
	Street	425	EA	1985	20	560	238,000	71,400	-	5.0%	0.1233%
SUBTOTAL							9,650,155	5,167,177	90,000.00		2.7081%
General Requirements		15	%				1,447,523	775,077	13,500		
SUBTOTAL							11,097,678	5,942,254	103,500		
Contingency[a]		5	%				554,884	297,113	10,350		
CONSTRUCTION TOTAL							11,652,562	6,239,367	113,850		
Engineering		10	%				1,165,256	623,937	11,385		
Services During Construction		6	%				699,154	374,362	6,831		
TOTAL							**13,516,972**	**7,237,665**	**132,066**		

[a] 10 percent contingency used to remedy any current deficiencies.

Notes:

Costs estimated at order of magnitude level.
RCN = replacement cost new
RCNLD = replacement cost new less depreciation
AWG = American Wire Gauge
ea = each
lf = linear feet
Nom kVA = nominal kilovolt-amperes
ph - phase
V = volts
w = wire

5.2.2 System Capacity

The system appears to be adequately sized for current loads, and based on the projected future peak demand of 31 MW has excess capacity to accommodate future demands. The 1995 power system study by Southern Engineering Company indicated that the load on each feeder circuit is less than the circuit's capacity, to a greater degree at the Training Annex than at the Main Base (the applicable table from the Southern Engineering study is provided in Volume II). Based on current and projected future requirements, the system has adequate capacity and flexibility to provide the base with sufficient quantities of reliable electric power.

5.2.3 Off-Installation Utility Capabilities

Although the electrical system at Lackland AFB has excess capacity, this utility is only an on-Base distribution system and therefore cannot serve as a source of supply or distribution for off-Base utilities. Similarly, electrical power suppliers have adequate capacity to continue supplying Lackland AFB, but they cannot provide an alternative distribution system for the Base.

5.3 Operational Impact Analysis Summary

As discussed in Section 3.0, the ORM workshop results indicate that, even with control measures, several risks associated with privatization of the Lackland AFB utilities would be ranked as "high . Subsequent consideration by senior leadership led to the conclusion that these risks are within the Base's risk tolerance.

Slower response time to power outages in mission-critical areas, and a potential decrease in the quality and reliability of the power in critical areas, were judged to be the highest risks associated specifically with privatization of the electrical utility. These deserve careful consideration in developing an RFP and a post award management plan for privatization of the electric utility.

5.4 Regulatory Review

The following are findings based on information presented in Section 4.0:

- The Lackland AFB electrical system is open to competitive bidding.
- Lackland AFB, including the Main Base and the Training Annex, is included within an electric CCN held by CPS (PUCT Docket No. 59, issued in 1977). A buyer other than CPS could apply to the PUCT for dual certification. If CPS consented, the application could be handled administratively. However, since Lackland AFB is a federal enclave with exclusive jurisdiction, a buyer could petition the PUCT to amend CPS's CCN to delete Lackland AFB from the service area. The amendment petition would be based on federal exclusive jurisdiction over Lackland AFB; prior state action

to include the Base within CPS's CCN was without effect since PUCT never had jurisdiction to issue the CCN. In addition, since an alternative buyer would own the existing distribution system, CPS would be unable to serve the Base.

- Because Lackland AFB is not within the municipal limits, the PUCT would have original rate and quality of service jurisdiction over the proprietary area if a buyer other than CPS obtained the bid. The exclusive federal enclave areas of the Base would not be subject to original rate or quality of service jurisdiction of either the City of San Antonio or the PUCT. However, as a purchaser of wholesale electricity, a buyer other than CPS would have to apply to the PUCT to establish status as a wholesale customer.

5.5 Market Analysis Summary

Section 2.0 presents the overall market analysis for Lackland AFB. The conclusions of this analysis that pertain specifically to the electrical distribution system are as follows:

- Five companies—one public utility (CPS, the current service provider) and four privately owned utility companies—expressed interest in purchasing the electrical distribution system at Lackland AFB. Considerable competition for the system is therefore likely.
- Four companies, including CPS, demonstrated interest in bundling the Lackland electrical system with all available utilities at the seven bases addressed by the TRDP. The other company (TNMP) would like to acquire only the electrical utilities at the various bases. None of the companies expressed interest solely in Lackland AFB.
- The existing service provider (CPS) and the other companies propose developing a custom rate for on-base electrical service.
- Four of the five companies interested in the Lackland AFB electrical utility address conjunctive metering or billing in their responses; CPS does not. The responses generally indicate that metering and billing should be examined on a case-by-case basis. One company (U.S Filter-MK) proposes increasing electric, natural gas, and water metering to quantify utility usage separately at various Base facilities, and to focus on high-use facilities to facilitate energy and water conservation.
- The five interested companies provide some discussion of purchase price options. Some companies propose more than one option, and most of the companies' responses indicate flexibility in how a purchase price should be determined.

5.6 Preliminary Economic Analysis

This section presents the results of the economic analysis of privatizing the electric distribution system at Lackland AFB. The analysis includes the following elements:

- Status Quo Costs. These are the estimated operating and capital costs incurred today by the Air Force to operate the system. Estimates are also provided for the cost to remedy current deficiencies, the cost of renewals and replacements, and adjustments to current costs to properly sustain the system over the long term.
- Privatized Costs. This section estimates operating and capital costs likely to be incurred by a private operator of the system. It was assumed that the private utility provider would pass these costs on to the Air Force in rate charges. In addition to these rate charges, Air Force costs were included for transition to private ownership and for Air Force management of the utility service provider after the ownership transition is complete.
- Life Cycle Cost Comparison. Estimated 25-year cash flows are shown for status quo costs and privatized costs. The cash flows are discounted and the present value of the costs compared. This comparison shows estimated savings or added costs that are projected to result from privatization.

5.6.1 Status Quo Costs

Status Quo Operating Cost

The electric distribution utility operating cost for the status quo at Lackland AFB was estimated as shown in Table 5.6.1-1. These costs were developed using the general approach described in Section 1.3.

The status quo cost of operating and maintaining the electrical distribution system at Lackland AFB is $557,236; general and administrative costs are estimated to be $83,585, bringing the total operating cost to $640,822.

Status Quo Capital Cost

Cost to Remedy Current Deficiencies

As noted in Section 5.1.1, the Lackland AFB electrical system is generally in good condition. However, as described in the Lackland AFB Master Plan for Power Distribution System, dated June 19, 1995, some minor improvements are needed in order to comply with current regulations and code requirements. To make these improvements, it is estimated that the following costs will be incurred:

Fiscal Year	Description	Quantity	Cost ($)
2000	Correct miscellaneous grounding problems	108	54,000
2000	Relocate transformers that are too close to buildings	6	6,000
2000	Correct miscellaneous overhead clearance problems	60	30,000
Subtotal			90,000

General Requirements, Contingency, Engineering, and Services During Construction	42,066
TOTAL	**132,066**

These costs are incorporated in Table 5.1.2-1 under “Cost to Remedy Current Deficiencies.”

TABLE 5.6.1-1

Estimated Electric Utility Operating Costs for Status Quo Alternative

Lackland AFB

USAF Utilities Privatization, Feasibility Analysis Report

	Status Quo	
Cost Component	**Hourly Data**	**Annual Cost**
Operation and Maintenance Cost ($)		
Costs Available on Cost-per-Hour Basis		
Adjusted Shop Rate (Hourly Rate)		
Labor--Military	$8.46	
Labor--Civilian	17.94	
Civilian Benefits	7.09	
Incremental Direct Costs	2.78	
Indirect Materials	1.70	
Vehicles	2.17	
Facilities	0.74	
Total Hourly Rate	$40.87	
Annual Labor Requirements (hours)		
Full Time		
Military		
Positions	2	
Utilization	75%	
Hours	3,120	
Civilian		
Positions	4	
Utilization	100%	
Hours	8,320	
Part Time		
Military		
Positions	-	
Utilization	-	
Hours	-	
Civilian		
Positions	-	
Utilization	-	
Hours	-	
Total Annual Labor Requirements	11,440	
Total Costs (hourly rate times annual labor rqmt)		$467,567
Costs Available on Annual Cost Basis		
Direct Materials		78,362
Project Contracts		-
Service Contracts		11,307
Environmental Compliance		-
Supporting Utilities		-
Total Costs		$89,669
Total Operation and Maintenance Cost		$557,236
General and Administrative Cost (15%)		83,585
Total Operating Cost		$640,822

Renewal and Replacement Costs

The Lackland AFB electrical system will require ongoing renewals and replacements as the system depreciates with time**.** Over the long term, the average renewal and replacement rate for the overall system is likely to be about the same as the system's average depreciation rate. As shown in Table 5.1.2-1, the average depreciation rate for the electrical system is approximately 2.7 percent. Renewals and replacements on the system at this rate would have an annual cost of about $366,050 (2.7 percent times the system replacement cost of $13,516,972). This is approximately $380,505 in year 2001 dollars.

Adjustments to Status Quo Costs

As described in Section 5.1.1, the electric distribution system at Lackland AFB is in fair condition. The programmed construction projects will improve and upgrade the system. These upgrades will have minimal impact on required operations, and the present staff assigned to the electric utility system are sufficient to cover system operations and maintenance. Therefore, no adjustments to the status quo costs are required.

5.6.2 Privatization Costs

Utility Operating Cost

Electric utility service providers, either local or from outside the immediate area, would find it necessary to place personnel on the Base in a full-time capacity to monitor and act as a service coordinator in the event of a service interruption. Repair work would be done either through the corporation's own forces or through maintenance and service contracts with local providers. The vehicle through which repair work would be done would depend on the location of the utility provider. In a case where the utility provider has other existing service areas nearby, it is likely that the provider would supplement its staff on Base with its own repair crews. In a case where the utility provider does not have other service areas nearby, it is reasonable to assume that the corporation would rely on service contracts to supplement its staff on Base. The corporation with no other local service areas might find it necessary to have more full-time positions.

A comparison between the two types of service providers indicates that local and remotely located corporations would provide similar service cost scenarios for the electric distribution system at Lackland AFB. The estimated privatized annual operating cost of the Base electric system would be about $447,948 per year, as shown in Table 5.6.2-1.

The cost estimate for a privatized operation is based on a staff of 5 FTE for operation and maintenance (O&M) of the distribution system. The general and administrative (G&A) costs were estimated at 15 percent of the total costs. An allowance of $90,000 was included for direct material costs and service contracts. The hourly labor rate was adjusted to include benefits, indirect material costs, vehicle costs, and facility costs.

As noted in Section 3.2, the Air Force has specified use of the Maxwell AFB required response times for utility service interruptions and repairs as guidelines for this Feasibility

Analysis (see Volume II, Section 3.0). These requirements are comparable to those for a typical utility system; therefore, no additional costs associated with operational risk mitigation have been included in the privatized utility operating cost.

TABLE 5.6.2-1
Estimated Electric Utility Service Costs for the Private Operator
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

Operation and Maintenance Cost					
Costs Available on Cost-per-Hour Basis	Position 1	Position 2	Position 3	Position 4	Position 5
Labor, Including Benefits at 15%	$28.00	$26.00	$21.00	$15.00	$15.00
Incremental Direct Costs	2.78	2.78	2.78	2.78	2.78
Indirect Materials	1.70	1.70	1.70	1.70	1.70
Vehicles	1.00	4.00	1.00	6.00	0.00
Facilities	0.92	0.92	0.92	0.92	0.92
Subtotal	$34.40	$35.40	$27.40	$26.40	$20.40
Annual Labor Costs (hourly rate times hours)					
Full Time (2080 hours)					
Position 1	$71,552				
Position 2	$73,632				
Position 3	$56,992				
Position 4	$54,912				
Position 5	$42,432				
Total	$299,520				
Costs Available on Annual Cost Basis					
Direct Materials	$75,000				
Service Contracts	$15,000				
Total	$90,000				
Total Operation and Maintenance Cost	$389,520				
General and Administrative Costs (15%)	$58,428				
Total Operating Cost	$447,948				

Benchmarks from data published by the American Public Power Association (APPA) were used to evaluate this estimate for reasonableness. The following benchmarks were used to calculate annual operating costs for a typical electric utility with the general characteristics of the Base electric system:

- Transmission and distribution expenses per customer
- Customer accounts expense per customer
- G&A expense per customer

Using these benchmarks produced annual operating costs of $486,000. The annual operating costs decreased to $394,000 per year after adjustments were made to reflect specific situations of the Base electric system. These adjustments include:

- Reducing the cost of customer service and G&A expenses by 30 percent. Activities for this account consist of tasks such as meter reading and accounting. It is assumed that the utility would not read meters at every service, but would check the larger services on a periodic basis (e.g., monthly) and check the smaller services on a less frequent basis (e.g., quarterly).

- Adjustment to distribution system O&M based on system age or other system condition factors. In this case, the Base electric system has an average age of 18 years and is in good condition. Therefore, no adjustment was made to O&M costs.

This benchmark comparison shows the projected privatized operating costs to be reasonable. The total benchmark cost is within 12 percent of the projected costs for operation of the Lackland AFB electric system.

Utility Capital Cost

As noted above, the capital cost estimates for the status quo were projected on the basis of investments needed to put the utility system in good condition and maintain that condition for the long term. For the purposes of this preliminary economic analysis, it was assumed that these investments would be the same as those that would likely be made by a private utility provider.

Air Force Transition and Post-Award Administrative Costs

The Air Force will incur a number of costs in the process of privatizing its utility systems. Transition costs will include employee costs, such as severance costs and relocation costs, and activities needed to transfer functions to the new owner.

The Air Force has determined that employee transition and system transfer costs cannot be quantified with any certainty. As a result, the IPT concluded that these costs should not be included in the feasibility analysis. These costs will be become clearer as part of Phase III and will be included in the Certified Economic Analysis conducted in that phase of the privatization process.

Under private operation of the utility system, the Air Force would also incur costs to oversee the program. Activities associated with the oversight function would include meter reading, quality assurance, and contract compliance review. For the purpose of this analysis, it is assumed that this function will require 0.25 FTE or $12,500 annually.

Costs to Meter On-Base Facilities Not Currently Metered

Regardless of whether or not it privatizes the electrical system, the Air Force may decide to meter all on-base electrical system end users. Lackland AFB currently has 1,405 buildings and 105 electrical meters, and would therefore require an additional 1,300 meters (assuming one meter per building; Volume II, Section 5.0 presents a table showing the breakdown of meters and costs for each TRDP base). These meters would likely be single-phase for housing units and three-phase for other buildings. The estimated installed costs per meter are $1,200 for single-phase and $2,700 for three-phase (these costs assume digital meters, GE Model 9S). Assuming that 201 housing buildings and 1099 non-housing buildings require meters, the estimated total cost for all additional meters is approximately $3.2 million.

Because utility regulators and most parties interested in acquiring the system are open to conjunctively metered service, installation of meters at end uses, although beneficial, is probably not necessary. If the Air Force decides that meters should be installed, it is assumed that they would be installed under both the status quo and privatization alternatives. Because the costs would therefore be the same for both alternatives, they were excluded from the life-cycle cost analysis.

5.6.3 Life-Cycle Cost Comparison

A life-cycle cost comparison of the status quo and the privatization alternative is shown in Table 5.6.3-1 and is summarized as follows:

	Present Value ($)	Savings ($)	Savings (%)
Air Force Adjusted Status Quo	19,101,673		
Privatized Utility Public Owner	15,704,342	3,397,332	17.8
Private Owner	17,755,365	1,346,309	7.0

As shown, the results of the preliminary economic analysis are that privatization of the Lackland AFB electric system would be economic for the Air Force. Privatization potentially represents savings of as much as $3,397,332, or 17.8 percent.

These results are based on the present value of the status quo and privatized costs over a 25-year period. Cash flows for both the adjusted status quo and privatized cases were forecast based on cost analyses described above. The present value of costs is calculated by discounting the stream of annual costs at a 2.9 percent real discount rate. This is the 30-

year real interest rate on treasury notes and bonds as specified in OMB Circular No. A-94 (February 1999).

The present value of privatized costs differs depending on whether the owner is a public or a private utility. This results from the different cost of capital associated with financing routine renewals and replacements. The basis for including these differences in the present value calculations is discussed in Section 1.3.

TABLE 5.6.3-1
Electric Utility
Life Cycle Cost Comparison of Status Quo vs. Privatization Alternatives
Lackland AFB
USAF Utilities Privatization Feasibility Analysis Report

	Present Value		Estimated Actual ($)		Forecast ($)									
	(2001 dollars)		1998	1999	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Air Force Status Quo Costs														
Operating	12,069,853		640,822		666,128	666,128	666,128	666,128	666,128	666,128	666,128	666,128	666,128	666,128
Capital														
Remedies for Current Deficiencies	137,281		132,066		137,281									
Routine Renewals and Replacements	6,894,539		366,050		380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505
Total Air Force Costs	**19,101,673**				1,183,914	1,046,633	1,046,633	1,046,633	1,046,633	1,046,633	1,046,633	1,046,633	1,046,633	1,046,633
	Owner													
Privatized Costs	**Public**	**Private**												
Net Utility Provider Costs to be Recovered in Rate														
Operating	8,437,084	8,437,084	447,948		465,637	465,637	465,637	465,637	465,637	465,637	465,637	465,637	465,637	465,637
Capital														
Remedies for Current Deficiencies	137,281	177,323	132,066		137,281	-	-	-	-	-	-	-	-	-
Routine Renewals and Replacements	6,894,539	8,905,520			380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505
Air Force Management														
Air Force Program Oversight	235,437	235,437	12,500		12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994
Transition Costs	-	-			-									
Total Privatized Cost	**15,704,342**	**17,755,365**			996,418	859,136	859,136	859,136	859,136	859,136	859,136	859,136	859,136	859,136
Savings ($)	**3,397,332**	**1,346,309**			187,497	187,497	187,497	187,497	187,497	187,497	187,497	187,497	187,497	187,497
Savings (%)	**17.8%**	**7.0%**												

Notes:
1. Estimated actual costs in 1998 dollars; all other costs in 2001 dollars.
2. All costs after both corporate and individual Federal income tax.

FTE= Full Time Equivalent

Assumptions:

From Mid-year 1998 to Mid-year 1999	0.80%
From Mid-year 1999 to Mid-year 2000	1.50%
From Mid-year 2000 to Mid-year 2001	1.60%
Private Cost of Capital (real, after tax)	5.00%
Federal/Public Cost of Capital (real)	2.90%
Implicit Financing Period (Years)	30
FTE for Privatization Oversight	0.25
Annual Cost per FTE	$ 50,000

TABLE 5.6.3-1
Electric Utility
Life Cycle Cost Comparison of Status Quo vs. Privatization Alternatives
Lackland AFB
USAF Utilities Privatization Feasibility Analysis Report

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Air Force Status Quo Costs															
Operating	666,128	666,128	666,128	666,128	666,128	666,128	666,128	666,128	666,128	666,128	666,128	666,128	666,128	666,128	666,128
Capital															
Remedies for Current Deficiencies															
Routine Renewals and Replacements	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505
Total Air Force Costs	1,046,633	1,046,633	1,046,633	1,046,633	1,046,633	1,046,633	1,046,633	1,046,633	1,046,633	1,046,633	1,046,633	1,046,633	1,046,633	1,046,633	1,046,633
Privatized Costs															
Net Utility Provider Costs to be Recovered in Rate															
Operating	465,637	465,637	465,637	465,637	465,637	465,637	465,637	465,637	465,637	465,637	465,637	465,637	465,637	465,637	465,637
Capital															
Remedies for Current Deficiencies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Routine Renewals and Replacements	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505	380,505
Air Force Management															
Air Force Program Oversight (FAS)	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994
Transition Costs															
Total Privatized Cost	859,136	859,136	859,136	859,136	859,136	859,136	859,136	859,136	859,136	859,136	859,136	859,136	859,136	859,136	859,136
Savings ($)	187,497	187,497	187,497	187,497	187,497	187,497	187,497	187,497	187,497	187,497	187,497	187,497	187,497	187,497	187,497
Savings (%)															

5.7 Electrical System Conclusions

Given senior leadership's decision that Privatization of the electric utility system at Lackland AFB is within the Air Force's tolerance for risk, continuing to Phases II and III of the privatization process is warranted for Lackland's electric system. Market interest, operational impacts, the Texas regulatory environment, system conditions, and preliminary economics all support privatization of the electric distribution system.

6.0 Natural Gas Distribution System Analysis

6.1 System Overview

6.1.1 Description

Natural gas is supplied to Lackland AFB by City Public Service at a natural gas pressure reduction station (i.e., gate station) located on the south side of the Base near Building 5075. PG&E-Valero also has a gate station that was recently installed as an emergency backup to the City Public Service gate station and is located on the north side of the Base near Building 10175. The PG&E-Valero gate station was installed along with the high-pressure gas line that parallels the northern boundary of the Base and feeds the natural gas turbines at the Lackland Total Energy Plant (TEP) located near Wilford Hall Medical Center. Natural gas is used on the Base to meet space and water heating requirements as well as the compressed natural gas (CNG) fueling station located near Building 5023. There are no natural gas fired air conditioners on Base.

The natural gas utility at the Base is an old, mainly carbon steel distribution system that has experienced a high number of leaks in past years and therefore requires considerable maintenance. The distribution system is operated at two pressures. An outer loop of piping is kept at approximately 50 pounds per square inch gauge (psig). There are 15 regulator stations that lower this pressure to the distribution pressure of approximately 20 psig. The current operators could not offer a reason for having the high-pressure outer loop except to surmise that the higher pressure might be needed to feed certain loads at peak winter hours. The dominant carbon steel system has required the installation of 120 impressed-current cathodic protection rectifier stations. These stations are designed to protect the installed carbon steel piping (much of it installed without external corrosion coating) from external corrosion.

Approximately 45 percent of the system piping still in use was installed in the mid-1950s, and nearly 67 percent was installed before the mid-1970s. During the site visit, two regulator station code violations were observed: not providing acceptable overpressure protection for the downstream system, and not having a record of regulator maintenance. Both of these violations would require being fixed by an owning regulated local distribution company before operation.

The distribution piping (237,385 linear feet—lf) consists of 165,975 lf of carbon steel, 68,860 lf of polyethylene (PE), and 2,550 lf of polyvinyl chloride (PVC) pipe. Mains range from 2 to 8 inches in diameter, and service lines range from 3/4 to 1 inch. Each building has at least one regulator to lower the gas pressure for equipment and appliance use (i.e., 7 inches of water to 1 psig). Some buildings have gas meters, which were installed for internal charging and energy management purposes.

The Base operations group, located in Building 5495, consists of five operators who service the gas, water, and sewer utilities. These operators conduct meter reading, recurring maintenance, and line locating. Their experience is primarily with leaks and contractor dig-ins. They stated that they have not seen any pressure problems in this system during peak winter hourly demand. The operations group owns butt fusion and two electro-fusion machines. Building 5495 also holds fittings, tools, and some spare pipe.

A yearly leakage survey is completed by an outside contractor though Base Civil Engineering located in Building 5595. There have been years when several hundred leaks were located. These high-leak-frequency survey reports recorded a significant number of valves leaking, along with old leak repairs that had begun to leak at dresser couplings. Another cause of the leaks is the steel pipe that is uncoated and is being used beyond what would be considered a reasonable life. In addition, the small amount of PVC piping that was installed for gas service would not be chosen today. Although chemically acceptable for natural gas, PVC does not have the same ductility as PE and could be subject to fracture; therefore, it should be removed and replaced with PE. The action to replace the PVC is already programmed.

All new pipe installations are PE. As areas of steel piping are replaced with PE, the operations personnel are removing rectifiers from the CP system. The current number of 120 rectifier stations is reduced from 140 some 15 year ago. These rectifiers are rated at 2 to 6 amps. This is a significant number of rectifiers. It is likely that the number was driven by the high local water table and the number of metallic utilities that would interfere with trying to protect larger areas of gas piping from a single rectifier station. As a comparison, the City of Ellensburg, Washington (3,000 accounts), has a mainly steel distribution system that is protected by three rectifier stations.

6.1.2 Inventory and System Value

Table 6.1.2-1 presents an inventory of the natural gas utility system, together with estimated system value in terms of replacement costs and depreciation rates. The estimating process was based on “take-off” calculations augmented by real property records, as described in Section 1.3. Unit costs for each line item were then estimated based on a combination of sources listed in Section 1.3.6.

This inventory yields an overall RCN value of approximately $5,702,105 (see Table 6.1.2-1). Based on an estimate of installation dates and useful life for this type of equipment, the RNCLD is approximately $1,744,479.

6.2 Utility Requirements Assessment

6.2.1 Current and Future Natural Gas Demand

Lackland AFB currently has a peak gas demand of nearly 55,100 thousand cubic feet (MCF) per month. As noted in Section 1.2, key projects planned for the Base will increase

the total square footage of buildings on Base by about 4 percent. Given these plans, the capacity of the Base natural gas distribution system was evaluated based on future peak requirements of 58,000 MCF per month. Because of the ongoing energy conservation program at the Base, future peak requirements will likely be less than this level. Therefore, the capacity analysis is conservative in that it was performed with a forecast that is on the high side of the range of likely growth in peak requirements.

TABLE 6.1.2-1
Natural Gas Utility Inventory
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

Item	Size (in.)	Quantity	Unit	Approximate Year of Construction (Average)	Design Life (Years)	Estimated Unit Cost ($)	RCN ($)	RCNLD ($)	Cost to Remedy Current Deficiencies ($)	Depreciation Rate (%)	Weighted Depreciation Rate (%)
PE Gas Pipe[a]											
	6	800	lf	1995	75	18.50	14,800	14,011	-	1.3%	0.0048%
	4	22700	lf	1990	75	13.00	295,100	259,428	10,400	1.3%	0.0967%
	3	4975	lf	1995	75	12.00	59,700	56,516	-	1.3%	0.0196%
	2	31425	lf	1994	75	11.00	345,675	321,372	10,725	1.3%	0.1132%
	1	10750	lf	1991	75	10.00	107,500	96,700	15,600	1.3%	0.0352%
	3/4	600	lf	1995	75	10.00	6,000	5,680	-	1.3%	0.0020%
Steel Gas Pipe[a,b]											
	8	10900	lf	1957	40	21.00	228,900	6,930	154,959	2.5%	0.1406%
	6	16050	lf	1958	40	18.50	296,925	18,223	201,021	2.5%	0.1823%
	4	62780	lf	1960	40	13.00	816,140	78,231	552,526	2.5%	0.5012%
	3	28520	lf	1959	40	12.00	342,240	24,330	231,696	2.5%	0.2102%
	2	40950	lf	1964	40	11.00	450,450	76,010	304,953	2.5%	0.2766%
	1	6925	lf	1966	40	10.00	69,250	13,713	46,880	2.5%	0.0425%
Steel Plug Valves[c]											
	6	34	ea	1959	25	1,850	62,906	3,922	-	4.0%	0.0618%
	4	128	ea	1960	25	1,212	155,183	6,547	-	4.0%	0.1525%
	3	58	ea	1959	25	985	57,104	591	-	4.0%	0.0561%
	2	83	ea	1964	25	573	47,532	3,344	-	4.0%	0.0467%
	1	17	ea	1968	25	377	6,404	527	-	4.0%	0.0063%
PE Ball Valves											
	6	2	ea	1995	30	2,084	4,169	3,613	75,040	3.3%	0.0034%
	4	46	ea	1990	30	934	42,985	30,089	79,428	3.3%	0.0352%
	3	10	ea	1995	30	634	6,345	5,499	24,744	3.3%	0.0052%
	2	63	ea	1994	30	454	28,630	23,601	24,995	3.3%	0.0234%
	1	22	ea	1991	30	216	4,759	3,547	1,947	3.3%	0.0039%
Large Regulators		15	ea	1965	20	5,000	75,000	-	195,000		
Small Regulators[d]		480	ea	1985	20	1,000	480,000	176,000	-	5.0%	0.5896%
Large Meters[e]	1 psi	16	ea	1986	20	1,700	27,200	4,410	-	5.0%	0.0334%
Small Meters[e]	7 in. H2O	160	ea	1986	20	250	40,000	12,600	-	5.0%	0.0491%
Rectifier Stations[f]		120	ea	1967	15	-	-	-	-	6.7%	0.0000%

SUBTOTAL				4,070,897	1,245,434	1,929,913	2.69%
General Requirements	15	%		610,635	186,815		
SUBTOTAL				4,681,531	1,432,249		
Contingency[g]	5	%		234,077	71,612		
CONSTRUCTION TOTAL				4,915,608	1,503,861		
Engineering	10	%		491,561	150,386		
Services During Construction	6	%		294,936	90,232		
TOTAL				**5,702,105**	**1,744,479**	**1,929,913** [h]	

[a] Quantity estimate based on take-offs from Base drawings as modified by Base personnel.

[b] Unit cost estimate based on PE costs because PE would be installed today.

[c] Quantity estimate based on number of valves per unit length of pipe at Randolph AFB.

[d] Quantity estimate based on one regulator per occupied facility. Regulator size based on facility size and use.

[e] Quantity estimate based on Base meter lists. Meter size estimate based on facility size and use.

[f] Rectifier stations would not be used in a PE system. Therefore, they have no RCN value.

[g] 10 percent contingency used to remedy any current deficiencies.

[h] Cost estimates for remedies to system deficiencies are based on government estimates as presented in Form 1391 for each of the projects shown. Because these estimates already include general requirements, contingencies, engineering, and services during construction, they are not calculated and added at the bottom of the table, as they are for RCN and RCNLD estimates.

Notes:

All costs are in February 1999 dollars. Costs estimated at order of magnitude level.

RCN = replacement cost new
RCNLD = replacement cost new less depreciation
PE = polyethylene
in. = inches
lf = linear feet
ea = each
psi = pounds per square inch

6.2.2 System Capacity

It was concluded that the Lackland AFB natural gas distribution system is conservatively sized. Operators see little pressure reduction throughout the Base during peak loads. The Base as currently configured has no buildings with gas pressure concerns. In addition, the main sizes, system load, and looped configuration are all consistent with a system that is conservatively sized. Lackland AFB natural gas distribution system therefore likely has significant excess capacity to handle new loads.

The need for the high-pressure loop was discussed with the operators, and no reason was provided. Most systems this size run with only one distribution system pressure. It is likely that a purchasing local distribution company would set this distribution system up with one system pressure and remove the 15 regulator stations that have some code violations. The types and sizes of facilities planned for future construction at the Base will probably not affect the natural gas system performance.

6.2.3 Off-Installation Utility Capabilities

Although the natural gas utility system at Lackland AFB has excess capacity, this utility is only an on-Base distribution system and therefore cannot serve as a source of supply or distribution for off-Base utilities. Similarly, local natural gas suppliers have adequate capacity to continue bulk supply to Lackland AFB, but they cannot provide an alternative distribution system for the Base.

6.3 Operational Impact Analysis Summary

As discussed in Section 3.0, the ORM workshop results indicate that, even with control measures, several risks associated with privatization of the Lackland AFB utilities would be ranked as “high” and may exceed the Air Force tolerance for privatization risk. “High” risks were identified only for the electrical and water systems. Potential risks associated with privatizing the Base utilities in general (e.g., mission degradation due to decreased quality / reliability and slower response times) are assumed to apply to the natural gas system; these risks were ranked as “medium” or “high / medium” without control measures and would likely be further reduced with control measures (e.g., requiring stringent response times and performance standards on the part of the natural gas utility provider).

6.4 Regulatory Review Summary

Based on the findings of the regulatory analysis summarized in Section 4.0, the Lackland AFB natural gas distribution system is open to competitive bidding.

The state does not issue CCNs for natural gas service. RRC reports that CPS, the city-owned gas utility, serves the San Antonio area. Because Lackland AFB is not located

within any city's corporate limits, a city would not regulate the manner in which a buyer could use city streets if such use were necessary for the gas distribution system.

6.5 Market Analysis Summary

Section 2.0 presents the overall market analysis for Lackland AFB. The conclusions of this analysis that pertain specifically to the natural gas distribution system are as follows:

- Six companies—one public utility (CPS, the current service provider) and five privately owned utility companies—expressed interest in purchasing the natural gas system at Lackland AFB. Considerable competition for the system is therefore likely.
- Four companies, including CPS, demonstrated interest in bundling the Lackland natural gas system with all available utilities at the seven bases addressed by the TRDP. The other companies express interest in acquiring the Lackland natural gas system in addition to the gas systems at other bases.
- The existing service provider (CPS) and the other companies propose developing a custom rate for on-base natural gas service.
- Five of the six companies interested in the Lackland AFB natural gas system address conjunctive metering or billing in their responses; CPS does not. The responses generally indicate that metering and billing should be examined on a case-by-case basis. One company (U.S Filter-MK) proposes increasing electric, natural gas, and water metering to quantify utility usage separately at various Base facilities, and to focus on high-use facilities to facilitate energy and water conservation.

The six interested companies provide some discussion of purchase price options. Some companies propose more than one option, and most of the companies' responses indicate flexibility in how a purchase price should be determined.

6.6 Preliminary Economic Analysis

This section presents the results of the economic analysis of privatizing the natural gas distribution system at Lackland AFB. The analysis includes the following elements:

- Status Quo Costs. These are the estimated operating and capital costs incurred today by the Air Force to operate the system. Estimates are also provided for the cost to remedy current deficiencies, the cost of renewals and replacements, and adjustments to current costs to properly sustain the system over the long term.
- Privatized Costs. This section estimates operating and capital costs likely to be incurred by a private operator of the system. It was assumed that the private utility provider would pass these costs on to the Air Force in rate charges. In addition to these rate charges, Air Force costs were included for transition to private ownership

and for Air Force management of the utility service provider after the ownership transition is complete.

- Life Cycle Cost Comparison. Estimated 25-year cash flows are shown for status quo costs and privatized costs. The cash flows are discounted and the present value of the costs compared. This comparison shows estimated savings or added costs that are projected to result from privatization.

6.6.1 Status Quo Costs

Status Quo Operating Cost

The natural gas distribution utility operating cost for the status quo at Lackland AFB was estimated as shown in Table 6.6.1-1. These costs were developed using the general approach described in Section 1.3.

The status quo cost of operating and maintaining the natural gas distribution system at Lackland AFB is $294,542; general and administrative costs are estimated to be $67,745, bringing the total operating cost to $362,286.

Status Quo Capital Cost

Cost to Remedy Current Deficiencies

As noted in Section 6.2.2, the Lackland AFB natural gas system is in moderate condition**.** Most of the Base (approximately 70 percent) has old steel gas lines, including several areas with chronic leaks. As a result, the Base has programmed a number of projects to replace old steel piping and valves, at an estimated cost of approximately $1,735,000. As described in Section 6.2.2, the system is conservatively sized with excess capacity and provides natural gas at little pressure drop, even during peak operation.

The system has an outer loop that is held at approximately 40 psig while the rest of the distribution system is run at approximately 20 psig. The eventual removal of old steel pipe from the system will eliminate the need for two operating pressures and allow operation at one pressure, 40 psig. The change from old steel pipe to new PE pipe will also eliminate the need for the current 15 regulator station and 120 impressed current cathodic protection systems.

The system currently has an observed deficiency in that the 15 regulator stations do not have adequate overpressure protection. Repair of all of these stations to code requirements will cost approximately $195,000 (including allowances for general requirements, contingency, engineering, and services during construction). This estimate is based on an assumption that the current pressure control valves (PCVs) will be replaced by two PCVs installed in a pressure monitor arrangement (i.e., the PCVs will be in series, with one valve set to take over pressure control if the other valve fails).

The operations staff have been active in repairing the serious chronic leaks in the system. Because of the age of the system, 13 gas system projects have been programmed to replace

old steel pipe and valves with new PE pipe and valves. The costs of these projects are shown in Table 6.6.1-2. These cost estimates include allowances for general requirements, contingencies, engineering, and services during construction.

These cost estimates, plus the cost to repair the 15 regulator stations, are broken out by item in Table 6.1.2-1 under Cost to Remedy Current Deficiencies. The total cost to remedy current deficiencies is $1,929,913.

TABLE 6.6.1-1

Estimated Natural Gas Utility Operating Costs for the Status Quo Alternative

Lackland AFB

USAF Utilities Privatization, Feasibility Analysis Report

	Status Quo		Adjusted Status Quo	
Cost Component	**Hourly Data**	**Annual Cost**	**Hourly Data**	**Annual Cost**
Operation and Maintenance Cost ($)				
Costs Available on Cost-per-Hour Basis				
Adjusted Shop Rate (Hourly Rate)				
Labor--Military	$2.89		$2.89	
Labor--Civilian	18.38		18.38	
Civilian Benefits	7.26		7.26	
Incremental Direct Costs	2.92		2.92	
Indirect Materials	1.78		1.78	
Vehicles	0.20		0.20	
Facilities	0.35		0.35	
Total Hourly Rate	$33.78		$33.78	
Annual Labor Requirements (hours)				
Full Time				
Military				
Positions	-		-	
Utilization	-		-	
Hours	-		-	
Civilian				
Positions	-		-	
Utilization	-		-	
Hours	-		-	
Part Time				
Military				
Positions	2		2	
Utilization	40%		60%	
Hours	1,664		2,496	
Civilian				
Positions	8		8	
Utilization	40%		40%	
Hours	6,656		6,656	
Total Annual Labor Requirements	8,320		9,152	
Total Costs (hourly rate times annual labor rqmts)		$281,017		$309,118
Costs Available on Annual Cost Basis				
Direct Materials		$7,429		$10,000
Project Costs		404		-
Service Contracts		5,692		5,000
Environmental Compliance		-		-
Supporting Utilities		-		-
Total Costs		$13,525		$15,000
Total Operation and Maintenance Cost		$294,542		$324,118
General and Administration Cost (23%)		67,745		74,547
Total Operating Cost		$362,286		$398,665

TABLE 6.6.1-2
Cost to Remedy Natural Gas Utility Deficiencies
Lackland AFB
USAF Utilities Privatization Feasibility Analysis

Program FY[a]	Project No.	Description	Estimated Cost[b] ($)
1999	974027	Replace Gas Laterals	35,500
1999	984003	Replace Gas Laterals	23,000
1999	99XXXX	Replace Gas Line	104,600
2000	951020E	Replace Gas Line Military Drive	209,200
2000	961002G	Replace Gas Line Barnes 5200 Area	38,000
2000	961002H	Replace Gas Line Femoyer/Metzger	28,000
2000	961002L	Replace Gas Line Annex/Voyager	73,000
2000	8005	Replace Gas Line WHMC TEP	314,000
2001	941012	Replace Gas Regulators	104,600
2001	01XXXX	Replace Gas Line	261,400
2002	951129	Repair Gas Pits (360)	20,900
2002	02XXXX	Replace Gas Line	261,400
2003	03XXXX	Replace Gas Line	261,400
TOTAL			1,735,000

[a] It is assumed that projects programmed for 1999 and 2000 will not occur before 2001.
[b] Includes general requirements, contingency, engineering, and services during construction.

Renewal and Replacement Costs

Provided that the required construction projects listed in the preceding section are completed, the Lackland AFB system will then have replaced most of the old steel gas lines. The programmed projects appear to be focused on repairing the worst locations first. With this type of piping and valve replacement occurring over the next 5 years, other renewals and replacements will likely be deferred until this effort is complete. Because the majority of the piping and valves will be PE and new material, the renewal and replacement costs for the next 10 to 15 years are also expected to be limited.

During years the first 5 years, only renewals of meters and other regulators will be needed. It is forecast that renewals and replacements of meters and regulators will be

made at an average rate equal to the depreciation rate for this equipment. These pieces of the total system have an RCN value of about $871,500 and an annual renewal and replacement rate of approximately 5.0 percent or $43,600 (including allowances for general requirements, contingency, engineering, and services during construction). In 2001 dollars, this cost is $45,300.

From years 6 through 15, efforts to replace old steel pipe and valves are expected to be added to the ongoing meter and regulator replacements. It is forecast that renewals and replacements of steel pipe and valves will be made at average rates equal to their depreciation rates. The remaining steel pipe after the required construction projects are complete has an estimated RCN value of about $1,668,000 and an annual rate of approximately 2.5 percent or $41,700. The remaining steel plug valves are estimated to have an RCN value of about $264,800 and an annual renewal and replacement rate of approximately 4.0 percent or $10,600. Therefore, the total annual renewal and replacement cost for years 6 through 15 is forecast to be $95,900 ($99,700 in 2001 dollars).

From 16 to 25 years, some PE valves are expected to start requiring repair and/or replacement. It is forecast that renewals and replacements of these valves will be made at an average rate equal to the depreciation rate for this equipment. This would add approximately $10,700 per year (RCN of about $323,800, annual renewal and replacement rate of approximately 3.3 percent) to the $95,900 annual cost ($99,700 in 2001 dollars), for a total cost of $106,600 ($110,800 in 2001 dollars).

The PE pipe is not expected to require renewal and replacement until after 25 years. Costs to repair pipe broken by contractors are not included in these estimates.

Adjustments to Status Quo Costs

The natural gas distribution system at Lackland AFB has regulator maintenance issues and system pipe that lacks coating for corrosion protection. Both of these situations will cause additional operational attention in the future. Construction of the programmed upgrade projects will decrease required operations, but system operating costs are projected to increase because of increasing leaks and the need for additional valve maintenance. Therefore, an adjustment to increase the status quo costs by 10 percent is required, bringing the annual operating costs to $398,665.

6.6.2 Privatization Costs

Utility Operating Cost

Natural gas utility service providers, either local or from outside the immediate area, would find it necessary to place personnel on the Base in full-time capacity to monitor and act as a service coordinator in the event of a service interruption. Repair work would be done either through the corporation's own forces or through maintenance and service contracts with local providers. The vehicle through which repair work would be done would depend on the location of the utility provider. In a case where the utility provider

has other existing service areas nearby, it is likely that the provider would supplement its staff on Base with its own repair crews. In a case where the utility provider does not have other service areas nearby, it is reasonable to assume that the corporation would rely on service contracts to supplement its staff on Base. The corporation with no other local service areas might find it necessary to have more full-time positions.

A comparison between the two types of service providers indicates that local and remotely located corporations would provide similar service cost scenarios for the gas distribution system at Lackland AFB. The estimated privatized annual operating cost of the gas system would be about $248,255 per year, as shown in Table 6.6.2-1.

The cost estimate for a privatized operation is based on a staff of 3 FTE for operation and maintenance (O&M) of the distribution system. The general and administrative (G&A) costs were estimated at 23 percent of the total costs. An allowance of $20,000 was included for direct material costs and service contracts. The hourly labor rate was adjusted to include benefits, indirect material costs, vehicle costs, and facility costs.

As noted in Section 3.2, the Air Force has specified use of the Maxwell AFB required response times for utility service interruptions and repairs as guidelines for this Feasibility Analysis (see Volume II, Section 3.0). These requirements are comparable to those for a typical utility system; therefore, no additional costs associated with operational risk mitigation have been included in the privatized utility operating cost.

Benchmarks from data published by the American Gas Association (AGA) were used to evaluate this estimate for reasonableness. The following benchmarks were used to calculate the annual operating costs for a typical gas utility with the general characteristics of the Base gas system:

- Total system plant value per employee
- Transmission and distribution expenses per mile of pipe
- Customer accounts expense per customer

The annual operating costs based on the system value benchmark are $145,000. This factor is influenced by the average age of the gas system, calculated as 26 years.

Using the benchmarks for transmission and distribution and for customer service produced annual operating costs of $256,000. The annual operating costs increased to $265,000 per year after adjustments were made to reflect specific situations of the Base gas system. These adjustments include:

- Reducing the cost of customer service expenses by 60 percent. Activities for this account consist of tasks such as meter reading and accounting. It is assumed that the utility would not read meters at every service, but would check the larger services on a periodic basis, such as monthly, and would check the smaller services on a less frequent basis, such as quarterly.

- Increasing O&M costs by 10 percent to reflect old, unprotected steel pipe and a lower percentage of PE pipe in the gas system. PE pipe has lower maintenance requirements and longer service life than steel pipe.

This benchmark comparison shows the projected privatized operating costs to be reasonable. The total benchmark cost is within 11 percent of the projected costs for operation of the Lackland AFB gas system.

TABLE 6.6.2-1
Estimated Natural Gas Utility Service Costs for the Private Operator
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

Operation and Maintenance Cost			
Costs Available on Cost-per-Hour Basis	Position 1	Position 2	Position 3
Labor, Including Benefits at 15%	$26.00	$25.00	$15.00
Incremental Direct Costs	2.92	2.92	2.92
Indirect Materials	1.78	1.78	1.78
Vehicles	1.00	4.00	1.00
Facilities	0.44	0.44	0.44
Subtotal	$32.14	$34.14	$21.14
Annual Labor Costs (hourly rate times hours)			
Full Time (2080 hours)			
Position 1	$66,851		
Position 2	$71,011		
Position 3	$43,971		
Total	$181,834		
Costs Available on Annual Cost Basis			
Direct Materials	$15,000		
Service Contracts	$5,000		
Total	$20,000		
Total Operation and Maintenance Cost	$201,834		
General and Administrative Costs (23%)	$46,422		
Total Operating Cost	$248,255		

Utility Capital Cost

As noted above, the capital cost estimates for the status quo were projected on the basis of investments needed to put the utility system in good condition and maintain that condition for the long term. For the purposes of this preliminary economic analysis, it was assumed that these investments would be the same as those that would likely be made by a private utility provider.

Air Force Transition and Post-Award Administrative Costs

The Air Force will incur a number of costs in the process of privatizing its utility systems. Transition costs will include employee costs, such as severance costs and relocation costs, and activities needed to transfer functions to the new owner.

The Air Force has determined that employee transition and system transfer costs cannot be quantified with any certainty. As a result, the IPT concluded that these costs should not be included in the feasibility analysis. These costs will be become clearer as part of Phase III and will be included in the Certified Economic Analysis conducted in that phase of the privatization process.

Under private operation of the utility system, the Air Force would also incur costs to oversee the program. Activities associated with the oversight function would include meter reading, quality assurance, and contract compliance review. For the purpose of this analysis, it is assumed that this function will require 0.25 FTE or $12,500 annually.

Costs to Meter On-Base Facilities Not Currently Metered

The Air Force, regardless of whether or not it privatizes the natural gas system, may decide to meter all on-base gas system end users. Lackland AFB currently has 1,405 buildings and 145 gas meters, and would therefore require an additional 1,260 meters (assuming one meter per building; Volume II, Section 6.0 presents a table showing the breakdown of meters and costs for each TRDP base). These meters would likely be small for housing units / small buildings and large for other buildings. The estimated installed costs per meter are $250 for small meters and $1,700 for large meters. Assuming that 90 percent of the meters are small, the estimated total cost for all additional meters is approximately $500,000.

Because utility regulators and most parties interested in acquiring the system are open to conjunctively metered service, installation of meters at end uses, although beneficial, is probably not necessary. If the Air Force decides that meters should be installed, it is assumed that they would be installed under both the status quo and privatization alternatives. Because the costs would therefore be the same for both alternatives, they were excluded from the life-cycle cost analysis.

6.6.3 Life-Cycle Cost Comparison

A life-cycle cost comparison of the status quo and the privatization alternative is shown in Table 6.6.3-1 and is summarized as follows:

	Present Value ($)	Savings ($)	Savings (%)
Air Force Adjusted Status Quo	11,128,167		
Privatized Utility	8,540,635	2,597,532	23.3
Public Owner			
Private Owner	9,586,308	1,541,859	13.9

As shown, the results of the preliminary economic analysis are that privatization of the Lackland AFB electric system would be economic for the Air Force. Privatization potentially represents savings of as much as $2,597,532 or 23.3 percent.

These results are based on the present value of the status quo and privatized costs over a 25-year period. Cash flows for both the adjusted status quo and privatized cases were forecast based on cost analyses described above. The present value of costs is calculated by discounting the stream of annual costs at a 2.9 percent real discount rate. This is the 30-year real interest rate on treasury notes and bonds as specified in OMB Circular No. A-94 (February 1999).

The present value of privatized costs differs depending on whether the owner is a public or a private utility. This results from the different cost of capital associated with financing routine renewals and replacements. The basis for including these differences in the present value calculations is discussed in Section 1.3.

6.7 Natural Gas Distribution System Conclusions

Privatization of the natural gas utility system at Lackland AFB is feasible, based on the findings of this report in the areas of market interest, operational impacts, the Texas regulatory environment, system conditions, and preliminary economics. The final feasibility of privatizing this system will not be known with certainty until the end of Phase III. At that time the actual bids from prospective system purchasers will be evaluated as part of the Air Force source selection process, and the final economic analysis will be certified. However, there is enough promise shown in the findings of this preliminary analysis to justify proceeding to Phase II of the Air Force privatization process.

TABLE 6.6.3-1
Natural Gas Utility
Life Cycle Cost Comparison of Status Quo vs. Privatization Alternatives
Lackland AFB
USAF Utilities Privatization Feasibility Analysis Report

	Present Value		Estimated Actual ($)		Forecast ($)									
	(2001 dollars)		1998	1999	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Air Force Status Quo Costs														
Operating	7,508,849		398,665		414,409	414,409	414,409	414,409	414,409	414,409	414,409	414,409	414,409	414,409
Capital														
Remedies for Current Deficiencies	2,006,126		1,929,913		2,006,126									
Routine Renewals and Replacements	1,613,192				45,300	45,300	45,300	45,300	45,300	99,700	99,700	99,700	99,700	99,700
Total Air Force Costs	**11,128,167**				2,465,834	459,709	459,709	459,709	459,709	514,109	514,109	514,109	514,109	514,109
	Owner													
Privatized Costs	**Public**	**Private**												
Net Utility Provider Costs to be Recovered in Rate														
Operating	4,675,880	4,675,880	248,255		258,059	258,059	258,059	258,059	258,059	258,059	258,059	258,059	258,059	258,059
Capital														
Remedies for Current Deficiencies	2,006,126	2,591,267	1,929,913		2,006,126	-	-	-	-	-	-	-	-	-
Routine Renewals and Replacements	1,613,192	2,083,724			45,300	45,300	45,300	45,300	45,300	99,700	99,700	99,700	99,700	99,700
Air Force Management														
Air Force Program Oversight	235,437	235,437	12,500		12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994
Transition Costs	-	-			-									
Total Privatized Cost	**8,530,635**	**9,586,308**			2,322,478	316,352	316,352	316,352	316,352	370,753	370,753	370,753	370,753	370,753
Savings ($)	**2,597,532**	**1,541,859**			143,356	143,356	143,356	143,356	143,356	143,356	143,356	143,356	143,356	143,356
Savings (%)	**23.3%**	**13.9%**												

Notes:
1. Estimated actual costs in 1998 dollars; all other costs in 2001 dollars.
2. All costs after both corporate and individual Federal income tax.
FTE= Full Time Equivalent

Assumptions:

From Mid-year 1998 to Mid-year 1999	0.80%
From Mid-year 1999 to Mid-year 2000	1.50%
From Mid-year 2000 to Mid-year 2001	1.60%
Private Cost of Capital (real, after tax)	5.00%
Federal/Public Cost of Capital (real)	2.90%
Implicit Financing Period (Years)	30
FTE for Privatization Oversight	0.25
Annual Cost per FTE	$ 50,000

TABLE 6.6.3-1
Natural Gas Utility
Life Cycle Cost Comparison of Status Quo vs. Privatization Alternatives
Lackland AFB
USAF Utilities Privatization Feasibility Analysis Report

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Air Force Status Quo Costs															
Operating	414,409	414,409	414,409	414,409	414,409	414,409	414,409	414,409	414,409	414,409	414,409	414,409	414,409	414,409	414,409
Capital															
Remedies for Current Deficiencies															
Routine Renewals and Replacements	99,700	99,700	99,700	99,700	99,700	110,800	110,800	110,800	110,800	110,800	110,800	110,800	110,800	110,800	110,800
Total Air Force Costs	514,109	514,109	514,109	514,109	514,109	525,209	525,209	525,209	525,209	525,209	525,209	525,209	525,209	525,209	525,209
Privatized Costs															
Net Utility Provider Costs to be Recovered in Rate															
Operating	258,059	258,059	258,059	258,059	258,059	258,059	258,059	258,059	258,059	258,059	258,059	258,059	258,059	258,059	258,059
Capital															
Remedies for Current Deficiencies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Routine Renewals and Replacements	99,700	99,700	99,700	99,700	99,700	110,800	110,800	110,800	110,800	110,800	110,800	110,800	110,800	110,800	110,800
Air Force Management															
Air Force Program Oversight (FAS)	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994
Transition Costs															
Total Privatized Cost	370,753	370,753	370,753	370,753	370,753	381,853	381,853	381,853	381,853	381,853	381,853	381,853	381,853	381,853	381,853
Savings ($)	143,356	143,356	143,356	143,356	143,356	143,356	143,356	143,356	143,356	143,356	143,356	143,356	143,356	143,356	143,356
Savings (%)															

7.0 Water System Analysis

7.1 System Overview

7.1.1 Description

Potable Water System

Lackland AFB obtains potable water from eight wells that withdraw water from the Edwards Aquifer. These wells and approximately 64 miles of distribution mains have the capability of providing the Main Base with potable water at over 13 million gallons per day (mgd) and the Lackland Training Annex with over 2.6 mgd. Table 7.1.1-1 lists the production capacity of each well. These capacities assume constant pumping for 24 hours.

TABLE 7.1.1-1
Water Well Production Capacity
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

Well Number	Production Capacity (mgd)
Lackland AFB (Main Base)	
1	1.82
2	1.10
3	2.36
4	2.28
5	2.61
6	3.06
Total Main Base	13.23
Lackland Training Annex	
1	0.88
2	1.79
Total Annex	2.76

Well depths range from 1,200 to 1,900 feet. The water obtained from these wells is slightly hard, but is considered to be of good quality. Chlorine and fluoride are added at each well. An emergency source is provided by a 12-inch-diameter main that is connected to the potable water system at Kelly AFB. The water distribution system is looped to enhance

delivery, and it contains four elevated storage tanks with a total storage capacity of 1,950,000 gallons.

The Lackland Training Annex obtains potable water from two wells that also withdraw water from the Edwards Aquifer. The Annex water distribution system contains approximately 13 miles of mains and has two elevated storage tanks with a combined capacity of 375,000 gallons. This system also is looped for enhanced delivery; however, dead-end mains service the firing range and the dog training area.

The predominant piping material used in each system is cast iron (CI). The remainder is constructed of polyvinyl chloride (PVC) and asbestos cement (AC) pipe. The CI piping is part of the original system and is generally in good condition, as is the newly installed PVC pipe. The AC pipe is in poor condition and in need of replacement.

The Air Force will retain its Edwards Aquifer water rights. Privatization of the water distribution system at Lackland AFB will be limited to providing production and distribution services. The water rights are therefore not included in this analysis.

Reclaimed Water System

Plans are underway to install infrastructure to take advantage of water reclamation initiatives sponsored by the San Antonio Water System (SAWS). SAWS is currently constructing a citywide system of pumping stations, storage reservoirs, and transmission mains that will distribute high-quality effluent from its water recycling centers to high-capacity potable water users throughout the city. Lackland AFB has been identified as a potential user of this resource. As a result, 36-inch transmission mains have been installed along the Base's eastern perimeter in Military Highway.

Pumping facilities at the Leon Creek Water Recycling Center and the Pearsall Road Recycled Water Pump Station are complete and ready to provide immediate service to Lackland AFB. Base personnel are currently reviewing distribution options to extend reclaimed water distribution mains into the Base to replace potable water use at locations where nonpotable water use is satisfactory. Such uses include landscape irrigation and evaporative cooling towers.

Ownership of on-Base reclaimed water distribution mains is expected to remain with SAWS. Air Force ownership will begin after the meter and will include pipes and appurtenances specific to the facility being served. Because these facilities have not yet been constructed, they are not included in this analysis.

7.1.2 Inventory and System Value

Table 7.1.2-1 presents an inventory of the water distribution system, together with estimated system value in terms of replacement costs and depreciation rates. The inventory was taken from Base data, which were then checked against Base water system utility maps, as described in Section 1.3.

Unit costs for each line item were estimated based on a combination of the sources listed in Section 1.3.6.

This inventory of facilities yields an overall calculated replacement cost new (RCN) value of approximately $21,461,067 (see Table 7.1.2-1). Based on estimated installation dates and

TABLE 7.1.2-1

Water Distribution Utility Inventory

Lackland AFB

USAF Utilities Privatization, Feasibility Analysis Report

Item	Size (in.)	Quantity	Unit	Approximate Year of Construction	Design Life (Years)	Estimated Unit Cost ($)	RCN ($)	RCNLD ($)	Cost to Remedy Current Deficiencies ($)	Depreciation Rate (%)	Weighted Depreciation Rate (%)
PVC Pipe											
	1.25	297	lf	1975	50	6.97	2,069	1,076	-	2.0%	0.0003%
	1.5	369	lf	1975	50	7.50	2,768	1,439	-	2.0%	0.0004%
	2	9,252	lf	1979	50	8.10	74,941	44,965	-	2.0%	0.0098%
	2.5	1,611	lf	1975	50	8.29	13,351	6,943	-	2.0%	0.0017%
	3	1,707	lf	1977	50	9.26	15,811	8,854	-	2.0%	0.0021%
	4	7,947	lf	1990	50	9.31	74,017	60,694	-	2.0%	0.0097%
	6	31,887	lf	1989	50	12.23	389,907	311,926	-	2.0%	0.0509%
	8	27,189	lf	1985	50	16.83	457,530	329,422	-	2.0%	0.0597%
	10	7,812	lf	1990	50	19.17	149,719	122,770	-	2.0%	0.0195%
	12	16,173	lf	1993	50	21.97	355,325	312,686	-	2.0%	0.0464%
	14	207	lf	1994	50	25.34	5,245	4,720	-	2.0%	0.0007%
Cast Iron Pipe[a]											
	1.5	684	lf	1960	50	7.50	5,130	1,129	-	2.0%	0.0007%
	1.75	207	lf	1960	50	8.10	1,677	369	-	2.0%	0.0002%
	2	5,220	lf	1964	50	8.10	42,282	12,685	-	2.0%	0.0055%
	3	639	lf	1968	50	9.26	5,919	2,249	-	2.0%	0.0008%
	4	3,906	lf	1960	50	9.31	36,380	8,004	-	2.0%	0.0047%
	6	24,804	lf	1961	50	12.23	303,298	72,791	-	2.0%	0.0396%
	8	576	lf	1970	50	16.83	9,693	4,071	-	2.0%	0.0013%
	10	71,046	lf	1961	50	19.17	1,361,616	326,788	-	2.0%	0.1777%
	12	44,343	lf	1960	50	40.29	1,786,592	393,050	-	2.0%	0.2332%
	14	28,989	lf	1962	50	49.00	1,420,542	369,341	-	2.0%	0.1854%
	16	21,276	lf	1964	50	56.60	1,204,281	361,284	-	2.0%	0.1572%
Copper Pipe											
	2	1,350	lf	1983	75	8.10	10,935	8,602	-	1.3%	0.0010%
	4	6,345	lf	1981	75	9.31	59,097	44,913	-	1.3%	0.0051%
Steel Pipe[a]											
	1.5	684	lf	1960	75	7.50	5,130	2,462	-	1.3%	0.0004%
	1.75	207	lf	1960	75	8.10	1,677	805	-	1.3%	0.0001%
	2	5,220	lf	1964	75	8.10	42,282	22,550	-	1.3%	0.0037%
	3	639	lf	1968	75	9.26	5,919	3,472	-	1.3%	0.0005%
Asbestos Cement Pipe[a]											
	3	300	lf	1975	50	9.26	2,779	1,445	-	2.0%	0.0004%
	4	2,322	lf	1964	50	9.31	21,627	6,488	-	2.0%	0.0028%
	5	1,017	lf	1960	50	10.31	10,482	2,306	-	2.0%	0.0014%
	6	11,664	lf	1967	50	12.23	142,625	51,345	-	2.0%	0.0186%
	8	3,510	lf	1966	50	16.83	59,066	20,082	-	2.0%	0.0077%
	10	1,377	lf	1960	50	19.17	26,391	5,806	-	2.0%	0.0034%
	12	315	lf	1960	50	40.29	12,691	2,792	-	2.0%	0.0017%

Cast Iron Gate Valves										
	1.5	2	ea	1970	25	205.00	410	-	-	4.0%	0.0001%
	1.75	1	ea	1970	25	215.00	215	-	-	4.0%	0.0001%
	2	48	ea	1970	25	220.00	10,560	-	-	4.0%	0.0028%
	2.5	8	ea	1970	25	285.00	2,280	-	-	4.0%	0.0006%
	3	16	ea	1970	25	410.00	6,560	-	-	4.0%	0.0017%
	4	69	ea	1970	25	715.00	49,335	-	-	4.0%	0.0129%
	5	1	ea	1970	25	780.00	780	-	-	4.0%	0.0002%
	6	358	ea	1970	25	840.00	300,720	-	-	4.0%	0.0785%
	8	145	ea	1970	25	970.00	140,650	-	-	4.0%	0.0367%
	10	84	ea	1970	25	1,360.00	114,240	-	-	4.0%	0.0298%
	12	85	ea	1970	25	1,520.00	129,200	-	-	4.0%	0.0337%
	14	2	ea	1970	25	4,520.00	9,040	-	-	4.0%	0.0024%
	16	1	ea	1970	25	5,900.00	5,900	-	-	4.0%	0.0015%
Fire Hydrants (4.5-inch Valve Size)		488	ea	1970	50	1,749.00	853,512	358,475	-	2.0%	0.1114%
Water Well										
Fixed Cost Per Well		8	ea	1960	10	95,000.00	760,000	-	-	10.0%	0.4960%
Cost Per Foot Drilled		13,174	ft	1960	10	20.00	263,480	-	-	10.0%	0.1720%
Chlorination Facilities		8	ea	1970	5	13,750.00	110,000	-	-	20.0%	0.1436%
Elevated Storage Tanks (Total cap. in gal)		1,950,000	gal	1970	75	2.28	4,446,000	2,726,880	-	1.3%	0.3869%
SUBTOTAL							15,321,673	6,015,680	2,369,479[b]		2.5652%
General Requirements		15	%				2,298,251	902,352	355,422		
SUBTOTAL							17,619,924	6,918,032	2,724,901		
Contingency[c]		5	%				880,996	345,902	272,490		
CONSTRUCTION TOTAL							18,500,920	7,263,933	2,997,391		
Engineering		10	%				1,850,092	726,393	299,739		
Services During Construction		6	%				1,110,055	435,836	179,843		
TOTAL							**21,461,067**	**8,426,162**	**3,476,973**		

[a] Unit cost estimate based on replacement by PVC for sizes up to 10 inches and by ductile iron for larger pipes.

[b] Estimate based on ten separate projects, listed in Table 7.6.1-1.

[c] 10 percent contingency used to remedy any current deficiencies.

Notes:

Quantity estimates based on take-offs from Base utility maps.

All costs are in February 1999 dollars. Costs estimated at order of magnitude level.

RCN = replacement cost new
RCNLD = replacement cost new less depreciation
PVC = polyvinyl chloride
lf = linear feet
ft = feet
ea = each
gal = gallon

useful life for this type of equipment, the calculated RCN less depreciation (RCNLD) is approximately $8,426,162.

The inherent value of the eight existing water wells located on the Main Base and at the Annex should also be taken into account when reviewing system replacement cost. Due to pumping restrictions imposed by the Edwards Aquifer Authority, the San Antonio Water System is attempting to secure water rights to privately owned wells that have been completed into the Edwards Aquifer. The market created by this demand has established a value of approximately $500 per acre-foot of historical production. Historical production takes into account the possibility that future use of these wells will be regulated and that future production will be restricted to levels equal to the historical maximum. The combined value of all the wells at Lackland AFB, at this rate, is approximately $2,663,807. Table 7.1.2-2 presents the estimated value of each well.

7.2 Utility Requirements Assessment

7.2.1 Current and Future Water System Demand

Lackland AFB currently has a peak water demand of 98 million gallons (MG) per month. This peak normally occurs in the summer. As noted in Section 1.2, key projects planned for Lackland will increase the total square footage of buildings on base by about 4 percent. Based on these plans, the capacity of the Lackland water system was evaluated based on future peak requirements of 102 MG per month. However, it is unlikely that irrigation requirements during peak demand months will increase. In addition, there is likely to be some building demolition. Therefore, the capacity analysis is considered to be conservative in that it was performed with a forecast that is on the high side of the range of likely growth in peak demands.

7.2.2 System Capacity

The existing potable water system at Lackland AFB is adequate for the needs of the Installation today and well into the future. Base documentation indicates that the water distribution system only needs to operate at 30 percent of capacity to satisfy the current needs of the installation. The remaining capacity is available for future Base development.

Additional capacity will be made available upon completion of the proposed reclaimed water distribution. Demands resulting from irrigation and cooling towers will be removed from the potable water system. This water volume can be considered excess capacity that can be used to extend system life or accommodate new construction.

7.2.3 Off-Installation Utility Capabilities

With only 30 percent of the system capacity currently being used, the potable water system at Lackland AFB has excess capacity that can be used for off-Base development. This capacity resides in the production capacity of the Base wells. However, use of these

wells for off-Base development is not likely. Negotiations between the Air Force and the San Antonio Water System regarding the exchange of well pumping rights for rate reductions for reclaimed water service have resulted in the Air Force deciding to retain all pumping rights for national defense reasons.

TABLE 7.1.2-2
Estimated Value of Water Well Pumping Rights at Lackland AFB
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

Well Designation	Capacity (mgd)	Historical Maximum Adjustment (%)	Adjusted Capacity (acre-feet per year)	Estimated Value ($)
Main Base				
1	1.82	30	610	$304,914
2	1.10	30	369	$184,289
3	2.36	30	791	$395,383
4	2.28	30	764	$381,980
5	2.61	30	875	$437,266
6	3.06	30	1,025	$512,657
Training Annex				
1	0.88	30	295	$147,431
2	1.79	30	600	$299,888
TOTAL				$2,663,807

[a] Based on unit value of $500 per acre-foot per year.

There are two utility service providers that have the capability of providing potable water service to the Base: the San Antonio Water System (SAWS) and the Bexar Metropolitan Water District. A brief analysis was conducted to assess whether it might be economic to have SAWS provide water to the Base rather than using the existing wells. The tabulation below presents a preliminary economic analysis that compares the cost of purchased water to continuation of the existing system. The cost of purchased water was estimated by multiplying total FY 1998 water usage by an average unit cost of water that would be charged to the Base based on SAWS current rate schedules. The cost of providing water using the Base's current system was estimated from the status quo operating and renewal and replacement costs described in Section 7.6.1.

Scenario 1 Close Wells and Purchase Water from SAWS	
Annual Usage (1,000 gal)	919,089
Estimated SAWS Unit Cost ($/1,000 gal)	$1.146
Estimated Cost of Purchased Water	$815,691
Scenario 2 Continue with Status Quo Pumping	
Adjusted Status Quo Operating Costs	$604,724
Annual Renewals and Replacements	$156,500
Annual Cost of Existing System	$761,224

As shown, this preliminary analysis indicates that costs are similar between the purchase of water from SAWS and continued Air Force on-Base water production. There has been some discussion of a significant rate increase by SAWS in the near future that should be considered in any subsequent analysis.

7.3 Operational Impact Analysis Summary

As discussed in Section 3.0, the ORM workshop results indicate that, even with control measures, several risks associated with privatization of the Lackland AFB utilities would be ranked as “high” and may exceed the Air Force tolerance for privatization risk.

Potential decreases in the quality and reliability of water supply service in critical areas were judged to be the highest risks associated specifically with privatization of the water utility. In addition, the Base treats its own water and might thus create an added security risk through privatization of this activity.

7.4 Regulatory Review

Based on the findings of the regulatory analysis summarized in Section 4.0, the Lackland AFB water system is open to competitive bidding.

The area within the Main Base and most of the Training Annex is not included within any CCN, but is surrounded by CCN No. 10640, held by SAWS, a municipally owned utility. The north side of the Training Annex is located adjacent to water CCN No. 10675. However, a utility other than SAWS could likely obtain a CCN for Lackland AFB. As discussed in Section 4.1.2, both utilities would have to prove their respective abilities to serve the Base, and since the purchaser would own the existing Base distribution system, SAWS would likely be unable to serve the Base. SAWS would not have access to the Base to build facilities to provide the service; they would need permission from the Base in the form of rights-of-way or easements. If the Air Force chose another utility provider, it would not provide access permission to SAWS and would not be obligated to do so.

7.5 Market Analysis Summary

Section 2.0 presents the overall market analysis for Lackland AFB. The conclusions of this analysis that pertain specifically to the water distribution system are as follows:

- Six companies—two public utilities (SAWS, the current service provider, and CPS) and four privately owned utility companies—express interest in purchasing the water and wastewater systems at Lackland AFB. Considerable competition for these systems is therefore likely.
- Four companies demonstrated interest in bundling the Lackland water system with all available utilities at the seven bases addressed by the TRDP. The other companies, including SAWS, express interest in acquiring the Lackland system in addition to the water and wastewater systems at other bases.
- SAWS proposes basing its service rates on its existing rate schedule, and noted that it is reevaluating its rate structure and may eliminate the current "Inside City Limit" (ICL) and "Outside City Limit" (OCL) differential in 1999. The other companies propose developing custom rates for on-base water service
- Four of the six companies interested in the Lackland AFB water system, including SAWS, address conjunctive metering or billing in their responses. The responses generally indicate that metering and billing should be examined on a case-by-case basis.
- SAWS and one other company (U.S Filter-MK) propose increasing water metering to quantify utility usage separately at various Base facilities, and to focus on high-use facilities to facilitate water conservation.
- The six interested companies provide some discussion of purchase price options. Some companies propose more than one option, and most of the companies' responses indicate flexibility in how a purchase price should be determined.

7.6 Preliminary Economic Analysis

This section presents the results of the economic analysis of privatizing the water system at Lackland AFB. The analysis includes the following elements:

- Status Quo Costs. These are the estimated operating and capital costs incurred today by the Air Force to operate the system. Estimates are also provided for the cost to remedy current deficiencies, the cost of renewals and replacements, and adjustments to current costs to properly sustain the system over the long term.
- Privatized Costs. This section estimates operating and capital costs likely to be incurred by a private operator of the system. It was assumed that the private utility provider would pass these costs on to the Air Force in rate charges. In addition to

these rate charges, Air Force costs were included for transition to private ownership and for Air Force management of the utility service provider after the ownership transition is complete.

- Life Cycle Cost Comparison. Estimated 25-year cash flows are shown for status quo costs and privatized costs. The cash flows are discounted and the present value of the costs compared. This comparison shows estimated savings or added costs that are projected to result from privatization.

7.6.1 Status Quo Costs

Status Quo Operating Cost

The water distribution (piping) and water plant (wells and pumps) utility operating cost for the status quo at Lackland AFB was estimated as shown in Table 7.6.1-1. These costs were developed using the general approach described in Section 1.3.

The status quo cost of operating and maintaining the water distribution system at Lackland AFB is $308,528; general and administrative costs are estimated to be $70,961, bringing the total operating cost of the water distribution system to $379,489.

The status quo cost of operating and maintaining the water plant is $522,188; general and administrative costs are estimated to be $120,103, bringing the total operating cost of the water plant to $642,292.

Total status quo cost of operating the water utility at Lackland AFB (including water distribution and water plant) is $1,021,781.

Status Quo Capital Cost

Cost to Remedy Current Deficiencies

Infrastructure surveys conducted by the Air Education Training Command (AETC) Fix Team have identified deficiencies in the existing potable water system. These deficiencies are specific to problems associated with aging distribution mains. Specific recommendations made by the Team include the following:

- Replacement of all existing AC piping Basewide
- Replacement of the East Range water line
- Water main replacement in the Capehart Housing Area

Table 7.6.1-2 lists the major water system construction projects programmed through 2003.

Renewal and Replacement Costs

It is assumed that the required construction projects described above will allow the water system at Lackland AFB to perform in accordance with state requirements. Therefore, the average renewal and replacement rate over the long term is likely to be about the same as the system's average depreciation rate. As shown in Table 7.1.2-2, the annual

depreciation rate for the potable water system is 2.5652 percent. Renewals and replacements on the system at this rate would have an annual cost of about $550,526 (2.5652 percent times the system cost of $21,461,067). This equals $572,266 in year 2001 dollars.

Adjustments to Status Quo Costs

Upon completion of the required replacement projects, maintenance requirements are expected to become less. The workload for existing staff should decrease to levels commensurate with the ability of existing staff. Therefore, no adjustments to the status quo costs are necessary.

TABLE 7.6.1-1
Estimated Water Distribution and Water Plant Utility Operating Costs for Status Quo Alternative
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

	Status Quo			
	Water Distribution		Water Plant	
Cost Component	**Hourly Data**	**Annual Cost**	**Hourly Data**	**Annual Cost**
Operation and Maintenance Cost ($)				
Costs Available on a Cost-per-Hour Basis				
Adjusted Shop Rate (Hourly Rate)				
Labor--Military	$2.89		$2.89	
Labor--Civilian	18.38		18.38	
Civilian Benefits	7.26		7.26	
Incremental Direct Costs	2.92		2.92	
Indirect Materials	1.78		1.78	
Vehicles	0.20		0.31	
Facilities	0.35		-	
Total Hourly Rate	$33.78		$33.53	
Annual Labor Requirements (hours)				
Full Time				
Military				
Positions	-		-	
Utilization	0		0	
Hours	-		-	
Civilian				
Positions	-		6	
Utilization	0%		100%	
Hours	-		12,480	
Part Time				
Military				
Positions	2		-	
Utilization	40%		0	
Hours	1,664		-	
Civilian				
Positions	8		1	
Utilization	40%		50%	
Hours	6,656		1,040	
Total Annual Labor Requirements	8,320		13,520	
Total Costs (hourly rate times annual labor rqmt)		$281,017		$453,352
Costs Available on Annual Cost Basis				
Direct Materials		23,730		68,836
Project Contracts		-		-
Service Contracts		3,781		-
Environmental Compliance		-		-
Supporting Utilities		-		-
Total Costs		$27,511		$68,836

Total Operation and Maintenance Cost	$308,528	$522,188
General and Administrative Cost (23%)	70,961	120,103
Total Operating Cost	$379,489	$642,292

Total Operating Costs Water Distribution	$379,489
Total Operating Costs Water Plant	$642,292
Total Operating Costs for Water Utility	$1,021,781

TABLE 7.6.1-2
Cost of Programmed Infrastructure Water Projects
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

Project Year	Project No.	Project Description	Estimated Cost ($)
1999	961002K	Replace water line to 8000 Area	129,800
1999	974027	Replace water service lines in Capehart Military Family Housing	34,000
1999	984003	Replace water service lines in Zachary Military Family Housing	22,000
2000	99610021	Replace water line to Lackland Annex	139,200
2000	994002	Replace water mains in Capehart Military Family Housing Area	372,000
2000	8006	Replace utility lines Basewide	500,000
2001	01XXXX	Replace AC water mains Basewide	650,000
2001	02XXXX	Replace AC water mains Basewide	650,000
2003	998003	Replace primary and secondary feed lines	300,000
2003	03XXXX	Replace AC water mains Basewide	650,000
TOTAL			3,447,000

These recommendations have been programmed as MILCON construction projects. Table 7.6.1-2 lists the costs of the programmed projects (including allowances for general requirements, contingencies, engineering, and services during construction).

7.6.2 Privatization Costs

Utility Operating Cost

The local municipal water utility, SAWS, could consolidate the Base water system into their existing municipal pipe network surrounding the Base. System operation and maintenance would be incorporated into the workload of existing staff. Base water facilities, such as pump stations, tanks, and treatment equipment, would be placed on the utility's recurring work program, and an operator would check these systems every day. Emergencies such as line breaks or service interruptions would require Base personnel to contact the utility's service coordinator who would come to the site to evaluate the problem. The service coordinator would then mobilize the utility's emergency work crews to correct the deficiency and restore service. Over time, the utility would find ways of reducing maintenance requirements by connecting the Base system to the existing city

system in ways that eliminate the need for various pressure maintenance facilities.

Remote owners would find it necessary to place someone on the Base in either a part-time or full-time capacity to monitor and act as a service coordinator in the event of a service interruption. Repair work would be done either through the remote owner's own forces or through maintenance and service contracts with local providers. The vehicle through which repair work is done would depend upon the density of systems for which the owner is responsible. In areas where the density is high, it is likely that the owner would have its own repair crews. In areas where the density is low, it is reasonable to assume that a remote owner would rely on service contracts.

A comparison of the above types of service providers indicates that the least operating cost scenario for the potable water system at Lackland AFB would be provided by the local municipal water utility, SAWS. They have the ability to allocate the cost of maintaining Base infrastructure to their entire system. The estimated privatized annual operating cost of the potable water system would be about $166,237 per year, as shown in Table 7.6.2-1.

The cost estimate for a privatized operation is based on a staff of 0.85 FTE for operation and maintenance (O&M) of the distribution system. This assumes seven persons working part time. The general and administrative (G&A) costs were estimated at 23 percent of the total costs. An allowance of $92,566 was included for direct material costs. The hourly labor rate was adjusted to include benefits, indirect material costs, vehicle costs, and facility costs.

As noted in Section 3.2, the Air Force has specified use of the Maxwell AFB required response times for utility service interruptions and repairs as guidelines for this Feasibility Analysis (see Volume II, Section 3.0). These requirements are comparable to those for a typical utility system; therefore, no additional costs associated with operational risk mitigation have been included in the privatized utility operating cost.

Utility Capital Cost

As noted above, the capital cost estimates for the status quo were projected on the basis of investments needed to put the utility system in good condition and maintain that condition for the long term. For the purposes of this preliminary economic analysis, it was assumed that these investments would be the same as those that would likely be made by a private utility provider.

Air Force Transition and Post-Award Administrative Costs

The Air Force will incur a number of costs in the process of privatizing its utility systems. Transition costs will include employee costs, such as severance costs and relocation costs, and activities needed to transfer functions to the new owner.

The Air Force has determined that employee transition and system transfer costs cannot be quantified with any certainty. As a result, the IPT concluded that these costs should not be included in the feasibility analysis. These costs will be become clearer as part of Phase III and will be included in the Certified Economic Analysis conducted in that phase of the privatization process.

TABLE 7.6.2-1
Estimated Water Distribution System Service Costs for Private Operator
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

Operation and Maintenance Cost

Costs Available on Cost-per-Hour Basis	System Operator	Service Coordinator	Repair Crew Foreman	Truck Driver	Backhoe Operator	Laborer 1	Laborer 2
Labor, Including Benefits at 15%	$19.50	$25.00	$22.00	$16.00	$18.00	$15.00	$15.00
Incremental Direct Costs	2.92	2.92	2.92	2.92	2.92	2.92	2.92
Indirect Materials	1.78	1.78	1.78	1.78	1.78	1.78	1.78
Vehicles	0.20	0.20	0.20	0.20	0.20		
Facilities	0.44	0.44	0.44	0.44	0.44	0.44	0.44
Subtotal	$24.84	$30.34	$27.34	$21.34	$23.34	$20.14	$20.14

Annual Labor Requirements (hours)
Full Time (2080 hours)
None required

Part Time	System Operator	Service Coordinator	Repair Crew Foreman	Truck Driver	Backhoe Operator	Laborer 1	Laborer 2
FTE	0.25	0.1	0.1	0.1	0.1	0.1	0.1
Annual Hours	520	208	208	208	208	208	208
Extended Labor Cost	$12,917	$6,311	$5,687	$4,439	$4,855	$4,189	$4,189

Total	$42,586
Costs Available on Annual Cost Basis	
Direct Materials ($)	92,566
Total Operation and Maintenance Cost	$135,152
General and Administrative Costs (23%)	31,085
Total Operating Cost	$166,237

Under private operation of the utility system, the Air Force would also incur costs to oversee the program. Activities associated with the oversight function would include meter reading, quality assurance, and contract compliance review. For the purpose of this analysis, it is assumed that this function will require 0.25 FTE or $12,500 annually.

Costs to Meter On-Base Facilities Not Currently Metered

The Air Force, regardless of whether or not it privatizes the water system, may decide to meter all on-base water system end users. Lackland AFB currently has 1,405 buildings and supplies its own water, and would therefore require 1,405 meters (assuming one meter per building; Volume II, Section 5.0 presents a table showing the breakdown of meters and costs for each TRDP base). These meters would likely range from ¾-inch- to 2-inch-diameter for housing buildings, and 3-inch-diameter for other buildings. The estimated installed costs per meter range from $155 to $3,425, depending on size. Assuming that half of the 1,405 buildings requiring meters are used for housing, and that the housing buildings are further subdivided by size, the estimated total cost for all additional meters is approximately $2.8 million.

Because utility regulators and most parties interested in acquiring the system are open to conjunctively metered service, installation of meters at end uses, although beneficial, is probably not necessary. If the Air Force decides that meters should be installed, it is assumed that they would be installed under both the status quo and privatization alternatives. Because the costs would therefore be the same for both alternatives, they were excluded from the life-cycle cost analysis.

7.6.3 Life-Cycle Cost Comparison

A life-cycle cost comparison of the status quo and the privatization alternative is shown in Table 7.6.3-1 and is summarized as follows:

	Present Value ($)	Savings ($)	Savings (%)
Air Force Adjusted Status Quo	33,228,608		
Privatized Utility Public Owner	17,349,911	15,878,697	47.8
Private Owner	21,428,555	11,800,053	35.5

As shown, the results of the preliminary economic analysis are that privatization of the Lackland AFB water system would be economic for the Air Force. Privatization potentially represents savings of as much as $15,878,697 or 47.8 percent.

These results are based on the present value of the status quo and privatized costs over a 25-year period. Cash flows for both the adjusted status quo and privatized cases were forecast based on cost analyses described above. The present value of costs is calculated by discounting the stream of annual costs at a 2.9 percent real discount rate. This is the 30-

year real interest rate on treasury notes and bonds as specified in OMB Circular No. A-94 (February 1999).

TABLE 7.6.3-1
Water Utility
Life Cycle Cost Comparison of Status Quo vs. Privatization Alternatives
Lackland AFB
USAF Utilities Privatization Feasibility Analysis Report

	Present Value		Estimated Actual ($)		Forecast ($)									
	(2001 dollars)		1998	1999	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Air Force Status Quo Costs														
Operating	19,245,199		1,021,781		1,062,131	1,062,131	1,062,131	1,062,131	1,062,131	1,062,131	1,062,131	1,062,131	1,062,131	1,062,131
Capital														
Remedies for Current Deficiencies	3,614,279		3,476,973		3,614,279									
Routine Renewals and Replacements	10,369,130		550,526		572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266
Total Air Force Costs	**33,228,608**				5,248,675	1,634,396	1,634,396	1,634,396	1,634,396	1,634,396	1,634,396	1,634,396	1,634,396	1,634,396
	Owner													
Privatized Costs	**Public**	**Private**												
Net Utility Provider Costs to be Recovered in Rate														
Operating	3,131,065	3,131,065	166,237		172,802	172,802	172,802	172,802	172,802	172,802	172,802	172,802	172,802	172,802
Capital														
Remedies for Current Deficiencies	3,614,279	4,668,482	3,476,973		3,614,279	-	-	-	-	-	-	-	-	-
Routine Renewals and Replacements	10,369,130	13,393,570			572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266
Air Force Management														
Air Force Program Oversight	235,437	235,437	12,500		12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994
Transition Costs	-	-			-									
Total Privatized Cost	**17,349,911**	**21,428,555**			4,372,340	758,061	758,061	758,061	758,061	758,061	758,061	758,061	758,061	758,061
Savings ($)	**15,878,697**	**11,800,053**			876,335	876,335	876,335	876,335	876,335	876,335	876,335	876,335	876,335	876,335
Savings (%)	**47.8%**	**35.5%**												

Notes:
1. Estimated actual costs in 1998 dollars; all other costs in 2001 dollars.
2. All costs after both corporate and individual Federal income tax.
FTE= Full Time Equivalent

Assumptions:

From Mid-year 1998 to Mid-year 1999	0.80%
From Mid-year 1999 to Mid-year 2000	1.50%
From Mid-year 2000 to Mid-year 2001	1.60%
Private Cost of Capital (real, after tax)	5.00%
Federal/Public Cost of Capital (real)	2.90%
Implicit Financing Period (Years)	30
FTE for Privatization Oversight	0.25
Annual Cost per FTE	$ 50,000

TABLE 7.6.3-1
Water Utility
Life Cycle Cost Comparison of Status Quo vs. Privatization Alternatives
Lackland AFB
USAF Utilities Privatization Feasibility Analysis Report

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Air Force Status Quo Costs															
Operating	1,062,131	1,062,131	1,062,131	1,062,131	1,062,131	1,062,131	1,062,131	1,062,131	1,062,131	1,062,131	1,062,131	1,062,131	1,062,131	1,062,131	1,062,131
Capital															
Remedies for Current Deficiencies															
Routine Renewals and Replacements	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266
Total Air Force Costs	1,634,396	1,634,396	1,634,396	1,634,396	1,634,396	1,634,396	1,634,396	1,634,396	1,634,396	1,634,396	1,634,396	1,634,396	1,634,396	1,634,396	1,634,396
Privatized Costs															
Net Utility Provider Costs to be Recovered in Rate															
Operating	172,802	172,802	172,802	172,802	172,802	172,802	172,802	172,802	172,802	172,802	172,802	172,802	172,802	172,802	172,802
Capital															
Remedies for Current Deficiencies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Routine Renewals and Replacements	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266	572,266
Air Force Management															
Air Force Program Oversight (FAS)	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994
Transition Costs															
Total Privatized Cost	758,061	758,061	758,061	758,061	758,061	758,061	758,061	758,061	758,061	758,061	758,061	758,061	758,061	758,061	758,061
Savings ($)	876,335	876,335	876,335	876,335	876,335	876,335	876,335	876,335	876,335	876,335	876,335	876,335	876,335	876,335	876,335
Savings (%)															

The present value of privatized costs differs depending on whether the owner is a public or a private utility. This results from the different cost of capital associated with financing routine renewals and replacements. The basis for including these differences in the present value calculations is discussed in Section 1.3.

7.7 Water System Conclusions

Privatization of the potable water utility system at Lackland AFB is feasible if senior leadership at the Base decides that the operational risk is within the Air Force's tolerance for risk. Based on the findings of this report, the market interest, the Texas regulatory environment, system conditions, and preliminary economics all support privatization of the water distribution system. Some of the Base's operation representatives have concluded that privatization of the water system presents high operational risks. If senior leadership decides the risk is beyond Air Force tolerance, privatization of the water utility system is infeasible; if leadership decides the risk are acceptable, the Air Force should proceed to Phase II of the privatization process for the water distribution system at Lackland AFB.

Wing Commander Recommendation: Proceed with study of privatization for water system.

8.0 Wastewater System Analysis

8.1 System Overview

8.1.1 Description

The wastewater collection system at Lackland AFB is a predominantly gravity-flow system consisting of approximately 41 miles of sewer mains. Eight lift stations (five on the main base and three on the annex) and force mains are used to connect individual facilities to the main system. Domestic sewage is treated by the San Antonio Water System (SAWS) at its Leon Creek Water Recycling Center. The Lackland system connects to the San Antonio system at four points located along the northern and eastern Base boundaries.

The main base system is in good condition. Over 80 percent of the original vitrified clay system has been replaced with polyvinyl chloride (PVC) pipe. The Wherry and Zachary Military Family Housing Areas are still operating on the original system. This part of the system is considered to be in poor condition.

The areas served by lift stations include the military working dogs area, the training annex cantonment area, and the firing ranges. The lift station in the military working dogs area is considered to be in poor condition and requires frequent maintenance. Sewage in the training annex cantonment area flows by gravity into the cantonment area lift station. It is then pumped through a 2-mile-long force main to an off-Base sewer owned by the San Antonio Water System near the northeast corner of the annex. This station is considered to be in good condition.

The pump stations in the firing ranges are small and collectively pump into two holding tanks. When they become full, the sewage is then removed by vacuum truck and is transported to the Leon Creek Water Recycling Center. Two other lift stations collect sewage from this area and pump sewage to off-Base sewer mains in the northwest corner of the annex. The lift stations and force mains in these areas are considered to be in good condition.

8.1.2 Inventory and System Value

Table 8.1.2-1 presents an inventory of the wastewater collection system, together with estimated system value in terms of replacement costs and depreciation rates. The inventory was taken from Base data, which was then checked against Base water system utility maps, as described in Section 1.3.

Unit costs for each line item were estimated based on a combination of the sources listed in Section 1.3.6.

This inventory of facilities yields an overall calculated RCN value of approximately $7,762,732 (see Table 8.1.2-1). Based on estimated installation dates and useful life for this type of equipment, the calculated RCNLD is approximately $5,234,551.

TABLE 8.1.2-1

Wastewater Collection System Inventory

Lackland AFB

USAF Utilities Privatization, Feasibility Analysis Report

Item	Size (in.)	Quantity	Unit	Approximate Year of Construction	Design Life (Years)	Estimated Unit Cost ($)	RCN ($)	RCNLD ($)	Cost to Remedy Current Deficiencies ($)	Depreciation Rate (%)	Weighted Depreciation Rate (%)
PVC Pipe											
	4	950	lf	1994	50	8.94	8,492	7,643	-	2.0%	0.0031%
	6	15,480	lf	1994	50	12.10	187,351	168,616	-	2.0%	0.0676%
	8	71,950	lf	1994	50	11.63	836,619	752,957	-	2.0%	0.3019%
	10	30,180	lf	1994	50	13.89	419,209	377,288	-	2.0%	0.1513%
	12	15,810	lf	1994	50	16.32	257,945	232,150	-	2.0%	0.0931%
	14	4,200	lf	1994	50	19.11	80,258	72,232	-	2.0%	0.0290%
	15	22,900	lf	1994	50	23.88	546,801	492,121	-	2.0%	0.1973%
	18	12,390	lf	1994	50	35.47	439,467	395,520	-	2.0%	0.1586%
	21	2,420	lf	1994	50	53.79	130,171	117,154	-	2.0%	0.0470%
	30	1,740	lf	1994	50	84.54	147,100	132,390	-	2.0%	0.0531%
PVC Pipe (Force Mains)											
	4	3,370	lf	1994	50	8.94	30,124	27,112	-	2.0%	0.0109%
	8	1,990	lf	1994	50	11.63	23,139	20,825	-	2.0%	0.0084%
Vitrified Clay Pipe[a]											
	6	12,010	lf	1955	50	12.10	145,354	17,443	-	2.0%	0.0525%
	8	4,470	lf	1955	50	11.63	51,976	6,237	-	2.0%	0.0188%
	10	2,810	lf	1955	50	13.89	39,032	4,684	-	2.0%	0.0141%
Standard Sanitary Sewer Manholes		1,500	ea	1970	40	1,146.00	1,719,000	472,725	-	2.5%	0.7754%
Wastewater Lift/Pump Stations		8	ea	1994	60	60,000.00	480,000	440,000	-	1.7%	0.1444%
SUBTOTAL							5,542,038	3,737,096	1,731,634 [b]		2.1262%
General Requirements		15	%				831,306	560,564	259,745		
SUBTOTAL							6,373,343	4,297,661	1,991,379		
Contingency[c]		5	%				318,667	214,883	199,138		
CONSTRUCTION TOTAL							6,692,011	4,512,544	2,190,517		
Engineering		10	%				669,201	451,254	219,052		
Services During Construction		6	%				401,521	270,753	131,431		
TOTAL							**7,762,732**	**5,234,551**	**2,541,000**		

[a] Unit cost estimate based on replacement by PVC pipe.

[b] Estimate based on eight separate projects, listed in Table 8.6.1-2.

[c] 10 percent contingency used to remedy any current deficiencies.

Notes:

Quantity estimates based on take-offs from Base utility maps.

All costs are in February 1999 dollars. Costs estimated at order of magnitude level.

RCN = replacement cost new

RCNLD = replacement cost new less depreciation

PVC = polyvinyl chloride

lf = linear feet

ft = feet

8.2 Utility Requirements Assessment

8.2.1 Current and Future Wastewater System Demand

Lackland AFB currently has a peak wastewater demand of 88 million gallons (MG) per month. As noted in Section 1.2, key projects planned for Lackland will increase the total square footage of buildings on Base by about 4 percent. These new facilities will increase the overall annual Base wastewater flows. Given these plans, the capacity of the Lackland wastewater system was evaluated based on future peak requirements of 92 MG per month. Because peak flows from the Air Force facilities are supplemented by system infiltration and inflow, future peak requirements will likely be less than this level. Therefore, the capacity analysis is conservative in that it was performed with a forecast that is on the high side of the range of likely growth in peak demands.

8.2.2 System Capacity

Recent reconstruction of the main base system assures satisfactory performance today and into the future. The capacity of the main base system is sufficient for current requirements and is also sufficient for forecasted flow increases resulting from new construction in the next 5 years.

The capacity of the Lackland Training Annex wastewater system is adequate for today's needs. The cantonment area lift station has excess capacity; however, capacities of lift stations serving the firing ranges are limited. These stations are limited not only by their own pump capacity, but also by the capacity of the holding tanks that they pump into.

8.2.3 Off-Installation Utility Capabilities

Wastewater collection facilities at Lackland AFB do not have sufficient capacity to provide wastewater service to areas off-Base. The Base does not have a wastewater treatment plant, and the excess capacities of on-Base lift stations are required to satisfy future Base development.

The San Antonio Water System is the only utility service provider that has the capability of providing wastewater service to the Base. The San Antonio Water System is the current provider of this service and has sewer mains surrounding the Base that have sufficient capacities for Base flows. The utility also owns and operates the regional wastewater treatment plant that currently receives flow from Lackland AFB.

8.3 Operational Impact Analysis Summary

As discussed in Section 3.0, the ORM workshop results indicate that, even with control measures, several risks associated with privatization of the Lackland AFB utilities would be ranked as “high” and may exceed the Air Force tolerance for privatization risk. “High”

risks were identified only for the electrical and water systems. Potential risks associated with privatizing the Base utilities in general (e.g., mission degradation due to decreased quality / reliability and slower response times) are assumed to apply to the wastewater system; these risks were ranked as "medium" or "high / medium" without control measures and would likely be further reduced with control measures (e.g., requiring stringent response times and performance standards on the part of the wastewater utility provider).

8.4 Regulatory Review

Based on the findings of the regulatory analysis summarized in Section 4.0, the Lackland AFB wastewater system is open to competitive bidding.

The Base is included within sewer CCN No. 20285, held by SAWS. A utility other than SAWS would need to obtain dual certification (if SAWS consents) or petition the TNRCC to amend the SAWS CCN by decertificating (deleting) the territory within the Base. Petition for decertification would be based on the buyer's title to the existing sewer system required to serve the Base; in addition, prior state action including the Base within the SAWS CCN may have been inconsistent with the federal enclave doctrine.

8.5 Market Analysis Summary

Section 2.0 presents the overall market analysis for Lackland AFB. The conclusions of this analysis that pertain specifically to the wastewater system are as follows:

- Six companies—two public utilities (SAWS, the current service provider, and CPS) and four privately owned utility companies—express interest in purchasing the water and wastewater systems at Lackland AFB. Considerable competition for these systems is therefore likely.
- Four companies demonstrated interest in bundling the Lackland wastewater system with all available utilities at the seven bases addressed by the TRDP. The other companies, including SAWS, express interest in acquiring the Lackland system in addition to the water and wastewater systems at other bases.
- SAWS proposes basing its service rates on its existing rate schedule, and noted that it is reevaluating its rate structure and may eliminate the current "Inside City Limit" (ICL) and "Outside City Limit" (OCL) differential in 1999. The other companies propose developing custom rates for on-base wastewater service.
- Four of the six companies interested in the Lackland AFB wastewater system, including SAWS, address conjunctive metering or billing in their responses. The responses generally indicate that metering and billing should be examined on a case-by-case basis. SAWS and one other company (U.S. Filter-MK) propose increasing

water metering to quantify utility usage separately at various Base facilities, and to focus on high-use facilities to facilitate water conservation. Wastewater billing is typically based on water usage, and one company (U.S. Filter-MK) notes that this would be the case.

- The six interested companies provide some discussion of purchase price options. Some companies propose more than one option, and most of the companies' responses indicate flexibility in how a purchase price should be determined.

8.6 Preliminary Economic Analysis

This section presents the results of the economic analysis of privatizing the wastewater collection system at Lackland AFB. The analysis includes the following elements:

- Status Quo Costs. These are the estimated operating and capital costs incurred today by the Air Force to operate the system. Estimates are also provided for the cost to remedy current deficiencies, the cost of renewals and replacements, and adjustments to current costs to properly sustain the system over the long term.
- Privatized Costs. This section estimates operating and capital costs likely to be incurred by a private operator of the system. It was assumed that the private utility provider would pass these costs on to the Air Force in rate charges. In addition to these rate charges, Air Force costs were included for transition to private ownership and for Air Force management of the utility service provider after the ownership transition is complete.
- Life Cycle Cost Comparison. Estimated 25-year cash flows are shown for status quo costs and privatized costs. The cash flows are discounted and the present value of the costs compared. This comparison shows estimated savings or added costs that are projected to result from privatization.

8.6.1 Status Quo Costs

Status Quo Operating Cost

The wastewater collection utility operating cost for the status quo at Lackland AFB was estimated as shown in Table 8.6.1-1. These costs were developed using the general approach described in Section 1.3.

The status quo cost of operating and maintaining the wastewater collection system at Lackland AFB is $168,195; general and administrative costs are estimated to be $25,229, bringing the total operating cost to $193,424.

Status Quo Capital Cost

Cost to Remedy Current Deficiencies

Infrastructure surveys conducted by the Air Education Training Command (AETC) Fix Team have identified deficiencies in the existing wastewater collection system. Specific recommendations made by the team include the following:

- Replacement of sewer laterals in the Capehart and Zachary Military Family Housing Area
- Elimination of the lift station at the Military Working Dogs Area
- Elimination of the sewage holding tanks near the firing ranges

These recommendations have been developed into programmed MILCON construction projects in the DD Form 1391s for 1997 to 2000. Table 8.6.1-2 lists the costs of the programmed projects (including allowances for general requirements, contingencies, engineering, and services during construction).

TABLE 8.6.1-1

Estimated Wastewater Collection System Operating Costs for Status Quo Alternative

Lackland AFB

USAF Utilities Privatization, Feasibility Analysis Report

	Status Quo	
Cost Component	**Hourly Data**	**Annual Cost**
Operation and Maintenance Cost ($)		
Costs Available on Cost-per-Hour Basis		
Adjusted Shop Rate (Hourly Rate)		
Labor--Military	$2.89	
Labor--Civilian	18.38	
Civilian Benefits	7.26	
Incremental Direct Costs	2.92	
Indirect Materials	1.78	
Vehicles	0.10	
Facilities	0.18	
Total Hourly Rate	$33.50	
Annual Labor Requirements (hours)		
Full Time		
Military		
Positions	-	
Utilization	-	
Hours	-	
Civilian		
Positions	-	
Utilization	-	
Hours	-	
Part Time		
Military		
Positions	2	
Utilization	20%	
Hours	832	
Civilian		
Positions	8	
Utilization	20%	
Hours	3,328	
Total Annual Labor Requirements	4,160	
Total Costs (hourly rate times annual labor rqmts)		$139,356
Costs Available on Annual Cost Basis		
Direct Materials		$22,245
Project Costs		-
Service Contracts		4,883
Environmental Compliance		-
Supporting Utilities		-
Other Costs		1,711
Total Costs		$28,839
Total Operation and Maintenance Cost		$168,195
General and Administrative Cost (15%)		25,229
Total Operating Cost		$193,424

TABLE 8.6.1-2
Cost of Programmed Wastewater Infrastructure Projects
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

Program Fiscal Year	Project No.	Project Description	Estimated Cost ($)
1999	971066	Military Working Dogs Area connection	200,000
1999	981040	Eliminate holding tanks	25,000
1999	984003	Replace laterals in Zachary Military Family Housing	22,000
1999	974027	Replace laterals in Capehart Military Family Housing	34,000
1999	25127	Install sewer to Prime Ribs Site	200,000
2000	XXXXX	Replace laterals, Basewide	2,000,000
2001	961002C	Replace sewer between Bldg. 10070 and 10075	10,000
2002	951043	Upgrade sanitary sewer tie-in to Kelly AFB	50,000
TOTAL			**2,541,000**

Renewal and Replacement Costs

It is assumed that the required construction projects described above will allow the Lackland AFB wastewater collection system to perform in accordance with state requirements. Therefore, the average renewal and replacement rate over the long term is likely to be about the same as the system's average depreciation rate. As shown in Table 8.1.2-1, the annual depreciation rate for the wastewater collection system is 2.1262 percent. Renewals and replacements on the system at this rate would have an annual cost of about $165,063 (2.1262 percent times the system cost of $7,762,732). This equals approximately $171,570 in year 2001 dollars.

Adjustments to Status Quo Costs

Upon completion of the required replacement projects, maintenance requirements are expected to become less. The workload for existing staff should decrease to levels commensurate with their ability. Therefore, no adjustments to the status quo costs are necessary.

8.6.2 Privatization Costs

Utility Operating Cost

The local municipal wastewater utility, SAWS, could consolidate the Base wastewater collection system into their existing collection system surrounding the Base. System operation and maintenance would be incorporated into the workload of existing staff. Base wastewater facilities, such as lift stations and treatment equipment, would be automated and placed on the utility's recurring work program. An operator would check these systems every day. Emergencies such as line breaks or service interruptions would require Base personnel to contact the utility's service coordinator, who would come to the site to evaluate the problem. The service coordinator would then mobilize the utility's emergency work crews to correct the deficiency and restore service. Over time, the utility would find ways of reducing maintenance requirements by connecting the Base system to the city system in ways that eliminate the need for lift stations or separate treatment facilities.

Remote owners would find it necessary to place someone on the Base either in a part-time or full time capacity to monitor and act as a service coordinator in the event of a service interruption. Repair work would be done either through the remote owner's own forces or through maintenance and service contracts with local providers. The vehicle through which repair work is done would depend upon the density of systems for which the owner is responsible. In areas where the density is high, it is likely that the owner would have its own repair crews. In areas where the density is low, it is reasonable to assume that a remote owner would rely on service contracts.

A comparison of the above types of service providers indicates that the least operating cost scenario for the wastewater collection system at Lackland AFB would be provided by the local wastewater utility, SAWS. They have the ability to allocate the cost of maintaining Base infrastructure to their entire system. The estimated privatized annual operating cost of the wastewater collection system would be about $64,913 per year, as shown in Table 8.6.2-1.

The cost estimate for a privatized operation is based on a staff of 0.6 FTE for operation and maintenance (O&M) of the collection system. This assumes seven persons working part time. The general and administrative (G&A) costs were estimated at 15 percent of the total costs. An allowance of $22,245 was included for direct material costs. The hourly labor rate was adjusted to include benefits, indirect material costs, vehicle costs, and facility costs.

As noted in Section 3.2, the Air Force has specified use of the Maxwell AFB required response times for utility service interruptions and repairs as guidelines for this Feasibility Analysis (see Volume II, Section 3.0). These requirements are comparable to those for a typical utility system; therefore, no additional costs associated with operational risk mitigation have been included in the privatized utility operating cost.

Utility Capital Cost

As noted above, the capital cost estimates for the status quo were projected on the basis of investments needed to put the utility system in good condition and maintain that condition for the long term. For the purposes of this preliminary economic analysis, it was assumed

TABLE 8.6.2-1
Estimated Wastewater Collection System Service Costs for Private Operator
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

Operation and Maintenance Cost

Costs Available on Cost-per-Hour Basis	System Operator	Service Coordinator	Repair Crew Foreman	Truck Driver	Backhoe Operator	Laborer 1	Laborer 2
Labor, Including Benefits at 15%	$19.50	$25.00	$22.00	$16.00	$18.00	$15.00	$15.00
Incremental Direct Costs	6.57	6.57	6.57	6.57	6.57	6.57	6.57
Indirect Materials	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Vehicles	1.00	1.00	1.00	3.00	2.50		
Facilities	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Subtotal	$27.78	$33.28	$30.28	$26.28	$27.78	$22.28	$22.28

Annual Labor Requirements (hours)
Full Time (2080 hours)
None required

Part Time	System Operator	Service Coordinator	Repair Crew Foreman	Truck Driver	Backhoe Operator	Laborer 1	Laborer 2
FTE	0.3	0.05	0.05	0.05	0.05	0.05	0.05
Annual Hours	624	104	104	104	104	104	104
Extended Labor Cost	$17,335	$3,461	$3,149	$2,733	$2,889	$2,317	$2,317

Total	$34,201
Costs Available on Annual Cost Basis	
Direct Materials ($)	22,245
Total Operation and Maintenance Cost	$56,446
General and Administrative Costs (15%)	$8,467
Total Operating Cost	$64,913

that these investments would be the same as those that would likely be made by a private utility provider.

Air Force Transition and Post-Award Administrative Costs

The Air Force will incur a number of costs in the process of privatizing its utility systems. Transition costs will include employee costs, such as severance costs and relocation costs, and activities needed to transfer functions to the new owner.

The Air Force has determined that employee transition and system transfer costs cannot be quantified with any certainty. As a result, the IPT concluded that these costs should not be included in the feasibility analysis. These costs will be become clearer as part of Phase III and will be included in the Certified Economic Analysis conducted in that phase of the privatization process.

Under private operation of the utility system, the Air Force would also incur costs to oversee the program. Activities associated with the oversight function would include meter reading, quality assurance, and contract compliance review. For the purpose of this analysis, it is assumed that this function will require 0.25 FTE or $12,500 annually.

Costs to Meter On-Base Facilities Not Currently Metered

Wastewater generation at Lackland AFB is metered only for the Base as a whole; service to individual buildings is not metered. This is consistent with standard industrial practice, which is to base invoices for wastewater service on the water usage for each building. Given the high cost of implementing building-specific wastewater metering, individual metering of buildings for wastewater generation at Lackland AFB is not recommended. See Section 7.6.2 for a discussion of potential water metering requirements and costs.

8.6.3 Life-Cycle Cost Comparison

A life-cycle cost comparison of the status quo and the privatization alternative is shown in Table 8.6.3-1 and is summarized as follows:

	Present Value ($)	Savings ($)	Savings (%)
Air Force Adjusted Status Quo	9,393,238		
Privatized Utility Public Owner	7,208,181	2,185,057	23.3
Private Owner	8,885,356	507,882	5.4

As shown, the results of the preliminary economic analysis are that privatization of the Lackland AFB wastewater system would be economic for the Air Force. Privatization potentially represents savings of as much as $2,185,057, or 23.2 percent.

These results are based on the present value of the status quo and privatized costs over a 25-year period. Cash flows for both the adjusted status quo and privatized cases were forecast based on cost analyses described above. The present value of costs is calculated by discounting the stream of annual costs at a 2.9 percent real discount rate. This is the 30-year

TABLE 8.6.3-1
Wastewater Collection System
Life Cycle Cost Comparison of Status Quo vs. Privatization Alternatives
Lackland AFB
USAF Utilities Privatization Feasibility Analysis Report

	Present Value		Estimated Actual ($)		Forecast ($)									
	(2001 dollars)		1998	1999	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Air Force Status Quo Costs														
Operating	3,643,136		193,424		201,062	201,062	201,062	201,062	201,062	201,062	201,062	201,062	201,062	201,062
Capital														
Remedies for Current Deficiencies	2,641,344		2,541,000		2,641,344									
Routine Renewals and Replacements	3,108,759		165,053		171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570
Total Air Force Costs	**9,393,238**				3,013,976	372,633	372,633	372,633	372,633	372,633	372,633	372,633	372,633	372,633
	Owner													
Privatized Costs	**Public**	**Private**												
Net Utility Provider Costs to be Recovered in Rate														
Operating	1,222,642	1,222,642	64,913		67,477	67,477	67,477	67,477	67,477	67,477	67,477	67,477	67,477	67,477
Capital														
Remedies for Current Deficiencies	2,641,344	3,411,764	2,541,000		2,641,344	-	-	-	-	-	-	-	-	-
Routine Renewals and Replacements	3,108,759	4,015,513			171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570
Air Force Management														
Air Force Program Oversight	235,437	235,437	12,500		12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994
Transition Costs	-	-			-									
Total Privatized Cost	**7,208,181**	**8,885,356**			2,893,385	252,041	252,041	252,041	252,041	252,041	252,041	252,041	252,041	252,041
Savings ($)	**2,185,057**	**507,882**			120,592	120,592	120,592	120,592	120,592	120,592	120,592	120,592	120,592	120,592
Savings (%)	**23.3%**	**5.4%**												

Notes:
1. Estimated actual costs in 1998 dollars; all other costs in 2001 dollars.
2. All costs after both corporate and individual Federal income tax.
FTE= Full Time Equivalent

Assumptions:

From Mid-year 1998 to Mid-year 1999	0.80%
From Mid-year 1999 to Mid-year 2000	1.50%
From Mid-year 2000 to Mid-year 2001	1.60%
Private Cost of Capital (real, after tax)	5.00%
Federal/Public Cost of Capital (real)	2.90%
Implicit Financing Period (Years)	30
FTE for Privatization Oversight	0.25
Annual Cost per FTE	$ 50,000

TABLE 8.6.3-1
Wastewater Collection System
Life Cycle Cost Comparison of Status Quo vs. Privatization Alternatives
Lackland AFB
USAF Utilities Privatization Feasibility Analysis Report

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Air Force Status Quo Costs															
Operating	201,062	201,062	201,062	201,062	201,062	201,062	201,062	201,062	201,062	201,062	201,062	201,062	201,062	201,062	201,062
Capital															
Remedies for Current Deficiencies															
Routine Renewals and Replacements	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570
Total Air Force Costs	372,633	372,633	372,633	372,633	372,633	372,633	372,633	372,633	372,633	372,633	372,633	372,633	372,633	372,633	372,633
Privatized Costs															
Net Utility Provider Costs to be Recovered in Rate															
Operating	67,477	67,477	67,477	67,477	67,477	67,477	67,477	67,477	67,477	67,477	67,477	67,477	67,477	67,477	67,477
Capital															
Remedies for Current Deficiencies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Routine Renewals and Replacements	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570	171,570
Air Force Management															
Air Force Program Oversight (FAS)	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994
Transition Costs															
Total Privatized Cost	252,041	252,041	252,041	252,041	252,041	252,041	252,041	252,041	252,041	252,041	252,041	252,041	252,041	252,041	252,041
Savings ($)	120,592	120,592	120,592	120,592	120,592	120,592	120,592	120,592	120,592	120,592	120,592	120,592	120,592	120,592	120,592
Savings (%)															

real interest rate on treasury notes and bonds as specified in OMB Circular No. A-94 (February 1999).

The present value of privatized costs differs depending on whether the owner is a public or a private utility. This results from the different cost of capital associated with financing routine renewals and replacements. The basis for including these differences in the present value calculations is discussed in Section 1.3.

8.7 Wastewater System Conclusions

Privatization of the wastewater collection system at Lackland AFB is feasible, based on the findings of this report in the areas of market interest, operational impacts, the Texas regulatory environment, system conditions, and preliminary economics. The final feasibility of privatizing this system will not be known with certainty until the end of Phase III. At that time the actual bids from prospective system purchasers will be evaluated as part of the Air Force source selection process, and the final economic analysis will be certified. However, there is enough promise shown in the findings of this preliminary analysis to justify proceeding to Phase II of the Air Force privatization process.

9.0 Total Energy Plant Analysis

9.1 System Overview

9.1.1 Description

The Total Energy Plant (TEP) at Lackland AFB provides the total energy needs of the Wilford Hall Medical Center. These energy services include electrical power, chilled water, steam, heating hot water, and domestic hot water. The TEP electric power supply is backed up with alternative sources, but the TEP is the sole provider to the hospital for the other energy systems. The electrical power circuits and chilled water pipe lines are routed to the hospital through an underground utility tunnel. The other system pipelines to the hospital are direct-buried piping.

The TEP electric power system is connected to the City Public Service electric system through Feeder No. 7 of the Base electric distribution system. Plant operations personnel indicated that the normal plant operating procedure is to operate the TEP generating units in parallel with the City Public Service system and purchase approximately 300 kilowatts (kW) from City Public Service. The TEP generating units provide the majority of the hospital's electric requirements. The TEP has four 1500-kW diesel generators that were installed in 1980. Two 5-megawatt (MW) combustion turbines are under construction, with completion estimated in the second quarter of 1999.

The switchgear for the electric system is located inside the TEP, and the main transformers are located outside the plant. The TEP building was completed in 1980.

The primary source of fuel for the engines and boilers is fuel oil. Fuel oil is received by truck and transferred to fuel oil storage tanks. The two 420,000-gallon storage tanks are contained by an earthen dike. The new combustion turbines will use natural gas as the primary fuel. A new high-pressure (350 pounds per square inch gauge—psig) gas line was constructed to provide the gas for these units.

Chilled water at 40 degrees Fahrenheit is produced for the hospital cooling (air conditioning) through a combination of absorption and centrifugal chillers. Waste heat boilers recover heat from the diesel engine exhausts to produce steam to supply one 600-ton and one 1000-ton absorption chiller. Two 1250-ton absorption chillers are being installed as part of the combustion turbine construction project. In addition to the absorption units, there are one 900-ton electric-driven chiller and two 1,950-ton diesel-engine-driven chillers.

The two cooling towers used in the chilled water process were installed in 1992 and 1993. Two additional cooling towers are being constructed as part of the combustion turbine project.

The chillers use R-22, R-134, and lithium bromide in the refrigerant cycle. R-22 can be recovered and recycled. There are no recovery units for the other refrigerants.

Three steam boilers provide steam at 80 psig for absorption chilling and water heating purposes. The boilers, one 400-horsepower (hp) and two 700 hp, were installed in 1988. The original boiler plant building was completed in 1957. The makeup water system for the boilers includes three water softening units and two 16,000-gallon brine/salt storage tanks.

The new combustion turbines are also equipped with waste heat boilers to provide steam for absorption chilling and water heating. After the combustion turbines are in service, the existing boilers will be operated in a standby mode. Waste heat recovered from the diesel engines is also used for heating hot water and domestic hot water for the hospital.

The TEP operates with a staff of 27 people, including 7 military positions. These staff operate and maintain the plant. Typically, a minimum of three operators are assigned to each of the three shifts. The chief operator controls the plant generation level to control the power flow into the TEP from City Public Service. An economic dispatch system to automatically control the power flow is in the planning phase. Major equipment in the plant is controlled manually.

During the site visit, the plant appeared well maintained and relatively clean considering the level of ongoing construction activity. A major overhaul of the diesel engines is performed every 3 years. All of the major plant components are included in the recurring work program schedule.

Although plant personnel maintain the facilities within the TEP, these staff do not maintain the piping once it is outside of the building or any of the equipment in the hospital. Within the plant, the plant maintenance staff work on electrical equipment at 480 volts or lower. An exterior electric group provides support for work on higher voltage equipment.

No major environmental issues were identified during discussions with plant personnel. There are no known polychlorinated biphenyls (PCBs) or asbestos at the plant; all insulation materials are fiberglass or calcium materials. Cooling tower blowdown is discharged to the sanitary sewer system. Monitoring wells have been installed to check on contamination from abandoned oil lines that had previously leaked oil into the soil. Test results indicate that the oil levels are decreasing.

In addition to the diesel generators in the TEP, three 600-kW diesel generators were constructed in 1998 and installed in a new building adjacent to the TEP. The electrical output of these units provides emergency backup for life support systems in the hospital.

9.1.2 Inventory and System Value

Table 9.1.2-1 presents an inventory of the TEP, together with estimated system value in terms of replacement costs and depreciation rates. The estimating process was based on "take-off" calculations for inventoried items and on estimates of equipment age or installation dates.

Unit costs were derived from a combination of the sources listed in Section 1.3.6 plus Marshall & Swift, LP. *Marshall Valuation Service, 1996,* and data provided by the Lackland AFB operating staff titled *Total Energy Plant Replacement Value (PRV),* 7 March 1997.

TABLE 9.1.2-1
TEP Utility Inventory
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

Item	Size	Quantity	Unit	Approximate Year of Construction	Design Life (Years)	Current Year	Estimated Unit Cost ($)	RCN ($)	RCNLD ($)	Cost to Remedy Current Deficiencies ($)	Depreciation Rate (%)	Weighted Depreciation Rate (%)
Generation												
Diesel engine/generator	1500 kW	4	ea	1980	40	1999	460,000	1,840,000	966,000	25,000	2.5%	0.1170%
Diesel engine generator	600 kW	3	ea	1998	40	1999	116,500	349,500	340,763	-	2.5%	0.0413%
Gas Turbine	5 MW	2	ea	1999	20	1999	1,980,000	3,960,000	3,960,000	-	5.0%	0.9596%
Transformers												
4/13.8 kV	2000 kVA	4	ea	1980	40	1999	35,700	142,800	74,970	-	2.5%	0.0091%
4/13.8 kV	5000 kVA	2	ea	1997	40	1999	55,000	110,000	104,500	-	2.5%	0.0127%
Switchgear												
4 KV for 1500 kW generator		4	ea	1994	30	1999	275,000	1,100,000	916,667	-	3.3%	0.1481%
4 kV for 5 MW generator		2	ea	1999	30	1999	275,000	550,000	550,000	-	3.3%	0.0888%
15 kV for feeders		20	ea	1980	40	1999	11,800	236,000	123,900	-	2.5%	0.0150%
Parallel connection (swgr & control)		1	ea	1994	30	1999	1,390,000	1,390,000	1,158,333	-	3.3%	0.1871%
Unit Substations												
Transformer & swgr	1000 kVA	1	ea	1980	30	1999	110,000	110,000	40,333	-	3.3%	0.0065%
Transformer & swgr	1500 kVA	1	ea	1980	30	1999	128,000	128,000	46,933	-	3.3%	0.0076%
Transformer & swgr	1500 kVA	1	ea	1993	30	1999	128,000	128,000	102,400	-	3.3%	0.0165%
Subtotal Power Generation								10,044,300	8,384,799			
Fuel Storage/Distribution												
Fuel oil tanks	10,000 bbl	2	ea	1980	40	1999	104,400	208,800	109,620	-	2.5%	0.0133%
Fuel storage basin		32,500	sf	1988	50	1999	5.5	178,750	139,425	-	2.0%	0.0135%
Oil/water separator		1	ea	1992	50	1999	82,500	82,500	70,950	-	2.0%	0.0069%
Subtotal Fuel Storage/Distribution								470,050	319,995			
Cooling Plant												
Absorption Chiller	600 ton	1	ea	1993	25	1999	307,000	307,000	233,320	-	4.0%	0.0452%
Absorption Chiller	1000 ton	1	ea	1993	25	1999	454,300	454,300	345,268	-	4.0%	0.0669%
Electric Chiller	900 ton	1	ea	1994	25	1999	163,100	163,100	130,480	-	4.0%	0.0253%
Absorption Chiller	1250 ton	2	ea	1999	25	1999	545,000	1,090,000	1,090,000	-	4.0%	0.2113%
Cooling Tower	1600 ton	1	ea	1992	25	1999	165,000	165,000	118,800	-	4.0%	0.0230%
Cooling Tower	4800 ton	1	ea	1993	25	1999	384,000	384,000	291,840	-	4.0%	0.0566%
Cooling Tower	1250 ton	2	ea	1999	25	1999	131,000	262,000	262,000	-	4.0%	0.0508%
Electric Chiller	1950 ton	2	ea	1980	25	1999	850,000	1,700,000	408,000	-	4.0%	0.0791%
Subtotal Cooling Plant								4,525,400	2,879,708			

Heating Plant												
Exhaust Heat Boiler	1500 kW	6	ea	1995	40	1999	139,500	837,000	753,300	-	2.5%	0.0913%
Exhaust Heat Boiler	5 MW	2	ea	1999	40	1999	517,000	1,034,000	1,034,000	-	2.5%	0.1253%
Natural Gas Boilers	400 hp	1	ea	1990	40	1999	84,000	84,000	65,100	-	2.5%	0.0079%
Natural Gas Boilers	700 hp	2	ea	1991	40	1999	117,200	234,400	187,520	-	2.5%	0.0227%
Deaerator	1000 gal	1	ea	1990	40	1999	84,600	84,600	65,565	-	2.5%	0.0079%
Deaerator for gas turbines EHB		1	ea	1999	40	1999	104,500	104,500	104,500	-	2.5%	0.0127%
Subtotal Heating Plant								2,378,500	2,209,985			
Facilities												
TEP Building		42,138	sf	1980	60	1999	150	6,320,700	4,319,145	-	1.7%	0.3489%
Heat Plant Building		6,618	sf	1957	60	1999	100	661,800	198,540	-	1.7%	0.0160%
Diesel Engine Building		3,000	sf	1998	60	1999	100	300,000	295,000	-	1.7%	0.0238%
Emerg. Gen./Transfer Switch	750 kW	1	ea	1996	50	1999	161,000	161,000	151,340	-	2.0%	0.0147%
Subtotal Facilities								7,443,500	4,964,025			
Subtotal of major components								24,861,750	18,758,512			2.8724%
Percentage for misc. components[a]		10	%		40			2,486,175	1,875,851		2.5%	0.2273%
SUBTOTAL								27,347,925	20,634,363	25,000		3.0997%
General Requirements		15	%					4,102,189	3,095,155	3,750		
SUBTOTAL								31,450,114	23,729,518	28,750		
Contingency[b]		5	%					1,572,506	1,186,476	2,875		
CONSTRUCTION TOTAL								33,022,619	24,915,994	31,625		
Engineering		10	%					3,302,262	2,491,599	3,163		
Services During Construction		6	%					1,981,357	1,494,960	1,898		
TOTAL								**38,306,239**	**28,902,553**	**36,685**		

[a] Percentage added to account for items not listed in inventory. Design life based on average age or life expectancy.

[b] 10 percent contingency used to remedy any current deficiencies.

Notes:

Quantity estimates based on base reports or plant inventory lists, site visit, and information from plant personnel.
All costs are in February 1999 dollars. Costs estimated at order of magnitude level.

RCN = replacement cost new	kW = kilowatts	bbl = barrels
RCNLD = replacement cost new less depreciation	MW = megawatts	hp = horsepower
EHB = exhaust heat boiler	kVA = kilovolt-amperes	gal = gallons

This inventory of facilities yields an overall RCN value of approximately $38,306,239 (see Table 9.1.2-1). Based on an estimate of installation dates and useful life for this type of equipment, the RCNLD is approximately $28,902,553.

9.2 Utility Requirements Assessment

9.2.1 Current and Future Demand

The Wilford Hall Medical Center has a peak electrical demand of approximately 7.5 MW. As noted in Section 1.2, key projects programmed for the medical center will increase the total square footage by about 1.2 percent. Given this increase, the capacity of the TEP was evaluated based on future peak production requirements of 7.7 MW.

The base keeps no records on chilled water or hot water demand. However, the TEP is currently meeting these demands and is increasing its capacity significantly with current construction projects.

9.2.2 System Capacity

The TEP currently has a peak electrical production of nearly 5.3 megawatts (MW). The TEP provides energy services only to Wilford Hall Medical Center. With the current upgrading of the TEP and the capacity increase of nearly 10 MW, the future peak electrical production capacity is expected to be adequate to meet the medical center demand. It was concluded that the additional capacity of the new combustion turbines, waste heat recovery boilers, and chillers will provide excess capacity of electricity, steam, chilled water, and hot water for the hospital. This excess capacity could be available for other buildings, and TEP personnel indicated that plans are under evaluation to provide energy services to other medical facilities located near the hospital. If the TEP were to provide energy to buildings in the immediate vicinity, these buildings currently have services that could remain in place and serve as backup units if the TEP output were restricted.

9.2.3 Off-Installation Utility Capabilities

There are no known providers of steam, hot water, or chilled water in the vicinity of Lackland AFB that would offer sales of these services to the Base. City Public Service might be able to sell additional electric power to the TEP for use in the hospital. However, the existing contract with City Public Service includes demand charges that would make short-term purchases uneconomical. Also, the plant operates as an integrated facility, with exhaust heat from the generating units providing steam that is used to produce both chilled and hot water.

The potential to provide services other than electric power from the TEP to off-Base facilities does not appear practical, because there are physical and economic limits on the distance that chilled water, hot water, or steam can be transported. The sale of excess

electric power from the TEP into the City Public Service system is currently constrained by reverse power relays that would operate if power were to flow from the TEP to the City Public Service system.

9.3 Operational Impact Analysis Summary

As discussed in Section 3.0, the ORM workshop results indicate that even with control measures, risks associated with privatization of the TEP utilities would be ranked as "high" and exceed the Air Force tolerance for privatization risk.

As noted above, the TEP provides the total energy needs of Wilford Hall. This includes electric power, chilled water, steam, heating hot water, and domestic hot water. Although the electric supply is backed-up with CPS power, the other energy needs are not. Therefore, there is significant concern about life-threatening impacts from a TEP failure.

9.4 Regulatory Review

Based on the findings of the regulatory analysis summarized in Section 4.0, the TEP at Lackland AFB is open to competitive bidding.

The regulation of water systems applies to potable water service. Utilities providing water (liquid or vapor) for heating and cooling purposes are not regulated, unless city streets are used for the pipelines, in which case the City of San Antonio may refuse to allow such use or may regulate the manner of use.

9.5 Market Analysis Summary

Section 2.0 presents the overall market analysis for Lackland AFB. The conclusions of this analysis that pertain specifically to the TEP are as follows:

- Six companies—two public utilities (SAWS and CPS, the current Lackland AFB water and gas providers) and four privately owned utility companies—express interest in purchasing the TEP. Considerable competition is therefore likely.
- Four companies demonstrated interest in bundling the plant with all available utilities at the seven bases addressed by the TRDP. One company (SAWS) expresses interest in acquiring the TEP in addition to the water and wastewater systems at Lackland and the other San Antonio-area bases. The other company (Texas-New Mexico Power Co.) expresses interest in acquiring the TEP in addition to the electric utilities at Lackland and five other bases.
- SAWS proposes basing its service rates on its existing rate schedule, and noted that it is reevaluating its rate structure and may eliminate the current "Inside City Limit"

(ICL) and "Outside City Limit" (OCL) differential in 1999. The other companies propose developing custom rates.

- Five of the six companies interested in the TEP, including SAWS, address conjunctive metering or billing in their responses. The responses generally indicate that metering and billing should be examined on a case-by-case basis. SAWS and one other company (U.S Filter-MK) propose increasing water metering to quantify utility usage separately at various Base facilities, and to focus on high-use facilities to facilitate water conservation.
- The six interested companies provide some discussion of purchase price options. Some companies propose more than one option, and most of the companies' responses indicate flexibility in how a purchase price should be determined.

9.6 Preliminary Economic Analysis

This section presents the results of the economic analysis of privatizing the TEP at Lackland AFB. The analysis includes the following elements:

- Status Quo Costs. These are the estimated operating and capital costs incurred today by the Air Force to operate the system. Estimates are also provided for the cost to remedy current deficiencies, the cost of renewals and replacements, and adjustments to current costs to properly sustain the system over the long term.
- Privatized Costs. This section estimates operating and capital costs likely to be incurred by a private operator of the system. It was assumed that the private utility provider would pass these costs on to the Air Force in rate charges. In addition to these rate charges, Air Force costs were included for transition to private ownership and for Air Force management of the utility service provider after the ownership transition is complete.
- Life Cycle Cost Comparison. Estimated 25-year cash flows are shown for status quo costs and privatized costs. The cash flows are discounted and the present value of the costs compared. This comparison shows estimated savings or added costs that are projected to result from privatization.

9.6.1 Status Quo Costs

Status Quo Operating Cost

The TEP operating cost for the status quo at Lackland AFB was estimated to be $4,949,400 per year as shown in Table 9.6.1-1. These costs were developed using the general approach described in Section 1.3. This approach was adjusted slightly in estimating costs for the Lackland TEP because Wilford Hall Medical Center reimburses Civil Engineers for labor at the TEP; actual labor costs for the TEP were available as an

annual cost. Other costs (vehicles and additional incremental direct costs) were included as an additive shop rate.

Status Quo Capital Cost

Cost to Remedy Current Deficiencies

As noted in Section 9.2.2, the TEP at Lackland AFB is in good condition and able to adequately meet existing and projected load requirements. Once the combustion turbine and chiller projects currently under construction are complete, the plant will essentially be state of the art. The only programmed project for the TEP is replacement of the 4-kV switchgear. Although the switchgear project would be beneficial to the plant, it does not address a violation. The total cost associated with this project is estimated at about $36,685.

TABLE 9.6.1-1
Estimated TEP Operating Costs for Status Quo Alternative
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

	Status Quo		Adjusted Status Quo	
Cost Component	**Hourly Data**	**Annual Cost**	**Hourly Data**	**Annual Cost**
Operation and Maintenance Cost ($)				
Costs Available on Cost-per-Hour Basis				
Additive Shop Rate (Hourly Rate)				
Incremental Direct Costs	1.84		1.84	
Vehicles	0.09		0.09	
Total Houraly Rate	$1.93		$1.93	
Annual Labor Requirements (hours)				
Full Time				
Military				
Positions	7		7	
Utilization	100%		100%	
Hours	14,560		14,560	
Civilian				
Positions	20		20	
Utilization	100%		100%	
Hours	41,600		41,600	
Part Time				
Military				
Positions	-		-	
Utilization	-		-	
Hours	-		-	
Civilian				
Positions	-		-	
Utilization	-		-	
Hours	-		-	
Total Annual Labor Requirement	56,160		56,160	
Total Costs (hourly rate times annual labor rqmt)		$108,185		$108,185
Costs Available on Annual Cost Basis				
Direct Materials		-		-
Project Costs		-		-
Service Contracts		94,164		194,164
Environmental Compliance		-		-
Supporting Utilities		-		-
Other Costs (Utilities)		2,422,100		2,422,100
Labor Costs		1,679,336		1,679,336
Total Costs		4,195,600		4,295,600
Total Operation and Maintenance Cost		$4,303,785		$4,403,785
General and Administrative Cost (15%)		645,568		660,568
Total Operating Cost		$4,949,353		$5,064,353

Renewal and Replacement Costs

Renewals and replacements for material life will be on the order of 3.1 percent of the RCN cost, or approximately $1,187,365 per year (see Table 9.1.2-1). This equals approximately $1,234,254 in year 2001 dollars. Renewals and replacements for major system components exceeding their useful lives will not occur for about 20 years. The recent addition of the combustion turbines, chillers, waste heat boilers, and hot water converter might affect the need to replace other operating units when they reach the age of retirement. For example, the boilers will operate as standby units after the new units on the combustion turbines are complete.

Adjustments to Status Quo Costs

The TEP at Lackland AFB is in good condition, as described in Section 9.1.1. The construction projects that are nearing completion should have a minimal impact on the status quo operating costs. The present staff allocation of full-time-equivalent (FTE) employees is sufficient to cover operation and normal maintenance services.

Capital expenditures with a total cost of $80,000 are programmed over the next 3 years. These projects include a new feeder to the MRI facility and replacement of the 4-kV switchgear. Neither of these projects would be expected to adjust the operating cost of the plant other than additional fuel cost for electric power generation.

Periodic inspections of the gas turbines will be an additional adjustment, estimated at $100,000 per year. This cost is based on a pro-rata overhaul cost of $12 per hour assuming a combined operating time of 8,400 hours per year. The turbines are typically overhauled after 20,000 to 30,000 hours of operation. It is assumed that this work will be contracted out to others, rather than performed by plant operating personnel. Assuming that the balance of the operating costs in the plant remain constant, this additional maintenance cost represents a 2 percent increase in operating costs. Therefore, an adjustment to increase the 1998 status quo costs by 2 percent is required, bringing the annual operating costs to $5,064,353.

9.6.2 Privatization Costs

Utility Operating Cost

The TEP plant operating company, either local or from outside the immediate area, would find it necessary to place personnel in the plant in a full-time capacity to monitor operations and act as a service coordinator in the event of a service interruption. Repair work would be done either through the corporation's own forces or through maintenance and service contracts with local providers. The vehicle through which repair work would be done would depend on the location of the plant operator. In a case where the operating company has other existing facilities nearby, it is likely that the provider would supplement its operating staff on Base with its own repair crews. In a case where the

plant operator does not have other facilities nearby, it is reasonable to assume that the corporation would rely on service contracts to supplement its staff on Base.

A comparison between the two types of service providers indicates that local and remotely located corporations would provide similar service cost scenarios for the TEP at Lackland AFB. The estimated privatized annual operating cost of the TEP would be about $3,937, 483 per year, as shown in Table 9.6.2-1.

TABLE 9.6.2-1
Estimated TEP Utility Service Costs for the Private Operator
Lackland AFB
USAF Utilities Privatization, Feasibility Analysis Report

	Position 1	Position 2	Position 3	Position 4	Position 5
Operation and Maintenance Cost					
Costs Available on Cost-per-Hour Basis					
Labor, Including Benefits at 15%	$28.00	$26.00	$21.00	$18.00	$15.00
Additive Incremental Direct Costs	1.84	1.84	1.84	1.84	1.84
Indirect Materials	0.00	0.00	0.00	0.00	0.00
Vehicles	1.00	0.08	0.08	0.08	0.08
Facilities	0.00	0.00	0.00	0.00	0.00
Subtotals	$30.84	$27.92	$22.92	$19.92	$16.92

Annual Labor Costs (hourly rate times hours)
Full Time (2080 hours)

	No. of People	
Position 1	1	$64,147
Position 2	2	$116,147
Position 3	5	$238,368
Position 4	5	$207,168
Position 5	5	$175,968
Total		$801,798

Costs Available on Annual Cost Basis	
Direct Materials	$0
Service Contracts	$200,000
Other Costs (Utilities)	$2,422,100
Total	$2,622,100
Total Operation and Maintenance Cost	$3,423,898
General and Administrative Costs (15%)	$513,585
Total Operating Cost	$3,937,483

The cost estimate for a privatized operation is based on an average of staff of 18 FTE for operation and maintenance (O&M) of the plant, rather than the current 22 civilian and 7 military positions. Staff positions include plant superintendent, maintenance supervisor, shift supervisor, chief operator (five), plant operator (five), plant helper (two) and maintenance (three). A minimum of two people would be in the plant at all times. The chief operator and plant operator positions are rotating shift positions covering 24-hour operation, 7 days per week. All other positions are assumed to be 40-hour-per-week positions normally assigned to the Monday-to-Friday day shift . One plant helper could be assigned to the second shift during the week if desired based on workload in the plant.

The general and administrative (G&A) costs were estimated at 15 percent of the total costs. The hourly labor rate was adjusted to include benefits, indirect material costs, vehicle costs, and facility costs. The estimated annual labor cost is $801,798 per year.

The nonlabor operating costs, including fuel costs, are assumed to remain constant because maintenance and other repairs would be performed at the same level as the present with one exception. An additional $100,000 was included for service work on the new gas turbines. This cost was also included in the adjustment to the status quo operating costs.

As noted in Section 3.2, the Air Force has specified use of the Maxwell AFB required response times for utility service interruptions and repairs as guidelines for this Feasibility Analysis (see Volume II, Section 3.0). These requirements are comparable to those for a typical utility system; therefore, no additional costs associated with operational risk mitigation have been included in the privatized utility operating cost.

Utility Capital Cost

As noted above, the capital cost estimates for the status quo were projected on the basis of investments needed to put the utility system in good condition and maintain that condition for the long term. For the purposes of this preliminary economic analysis, it was assumed that these investments would be the same as those that would likely be made by a private utility provider.

Air Force Transition and Post-Award Administrative Costs

The Air Force will incur a number of costs in the process of privatizing its utility systems. Transition costs will include employee costs, such as severance costs and relocation costs, and activities needed to transfer functions to the new owner.

The Air Force has determined that employee transition and system transfer costs cannot be quantified with any certainty. As a result, the IPT concluded that these costs should not be included in the feasibility analysis. These costs will be become clearer as part of Phase III and will be included in the Certified Economic Analysis conducted in that phase of the privatization process.

Under private operation of the utility system, the Air Force would also incur costs to oversee the program. Activities associated with the oversight function would include meter reading, quality assurance, and contract compliance review. For the purpose of this analysis, it is assumed that this function will require 0.25 FTE or $12,500 annually.

Costs to Meter On-Base Facilities Not Currently Metered

Because most parties interested in acquiring the system are open to conjunctively metered service, installation of meters at end uses is probably not necessary. If the Air Force decides that meters should be installed, it is assumed that they would be installed under both the status quo and privatization alternatives. Because the costs would therefore be the same for both alternatives, they were excluded from the life-cycle cost analysis.

9.6.3 Life-Cycle Cost Comparison

A life-cycle cost comparison of the status quo and the privatization alternative is shown in Table 9.6.3-1 and is summarized as follows:

	Present Value ($)	Savings ($)	Savings (%)
Air Force Adjusted Status Quo	117,789,007		
Privatized Utility			
Public Owner	96,799,896	20,989,111	17.8
Private Owner	103,334,084	14,454,924	12.3

As shown, the results of the preliminary economic analysis are that privatization of the Lackland AFB total energy plant would be economic for the Air Force. Privatization potentially represents savings of as much as $20,989,111, or 17.8 percent.

These results are based on the present value of the status quo and privatized costs over a 25-year period. Cash flows for both the adjusted status quo and privatized cases were forecast based on cost analyses described above. The present value of costs is calculated by discounting the stream of annual costs at a 2.9 percent real discount rate. This is the 30-year real interest rate on treasury notes and bonds as specified in OMB Circular No. A-94 (February 1999).

The present value of privatized costs differs depending on whether the owner is a public or a private utility. This results from the different cost of capital associated with financing routine renewals and replacements. The basis for including these differences in the present value calculations is discussed in Section 1.3.

9.7 Total Energy Plant Conclusions

Privatization is feasible from the standpoints of market interest, the Texas regulatory environment, system conditions, and preliminary economics. However, because the TEP

forms an integral part of the Wilford Hall Medical Center and is its sole energy provider, it is recommended that senior leadership at the Base determine whether operational risks potentially resulting from TEP privatization exceed the Air Force risk tolerance.

Wing Commander Recommendation: Exempt the TEP from further study of privatization because it is essentially a large mechanical room whose sole purpose is to provide energy for WHMC.

TABLE 9.6.3-1
Total Energy Plant
Life Cycle Cost Comparison of Status Quo vs. Privatization Alternatives
Lackland AFB
USAF Utilities Privatization Feasibility Analysis Report

	Present Value		Estimated Actual ($)		Forecast ($)									
	(2001 dollars)		1998	1999	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Air Force Status Quo Costs														
Operating	95,386,901		5,064,353		5,264,344	5,264,344	5,264,344	5,264,344	5,264,344	5,264,344	5,264,344	5,264,344	5,264,344	5,264,344
Capital														
Remedies for Current Deficiencies	38,134		36,685		38,134									
Routine Renewals and Replacements	22,363,972		1,187,365		1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254
Total Air Force Costs	**117,789,007**				6,536,731	6,498,597	6,498,597	6,498,597	6,498,597	6,498,597	6,498,597	6,498,597	6,498,597	6,498,597
	Owner													
Privatized Costs	**Public**	**Private**												
Net Utility Provider Costs to be Recovered in Rate														
Operating	74,162,353	74,162,353	3,937,483		4,092,974	4,092,974	4,092,974	4,092,974	4,092,974	4,092,974	4,092,974	4,092,974	4,092,974	4,092,974
Capital														
Remedies for Current Deficiencies	38,134	49,256	36,685		38,134	-	-	-	-	-	-	-	-	-
Routine Renewals and Replacements	22,363,972	28,887,037			1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254
Air Force Management														
Air Force Program Oversight	235,437	235,437	12,500		12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994
Transition Costs	-	-			-									
Total Privatized Cost	96,799,896	103,334,084			5,378,355	5,340,221	5,340,221	5,340,221	5,340,221	5,340,221	5,340,221	5,340,221	5,340,221	5,340,221
Savings ($)	**20,989,111**	**14,454,924**			1,158,376	1,158,376	1,158,376	1,158,376	1,158,376	1,158,376	1,158,376	1,158,376	1,158,376	1,158,376
Savings (%)	**17.8%**	**12.3%**												

Notes:
1. Estimated actual costs in 1998 dollars; all other costs in 2001 dollars.
2. All costs after both corporate and individual Federal income tax.
FTE= Full Time Equivalent

Assumptions:

From Mid-year 1998 to Mid-year 1999	0.80%
From Mid-year 1999 to Mid-year 2000	1.50%
From Mid-year 2000 to Mid-year 2001	1.60%
Private Cost of Capital (real, after tax)	5.00%
Federal/Public Cost of Capital (real)	2.90%
Implicit Financing Period (Years)	30
FTE for Privatization Oversight	0.25
Annual Cost per FTE	$ 50,000

TABLE 9.6.3-1
Total Energy Plant
Life Cycle Cost Comparison of Status Quo vs. Privatization Alternatives
Lackland AFB
USAF Utilities Privatization Feasibility Analysis Report

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Air Force Status Quo Costs															
Operating	5,264,344	5,264,344	5,264,344	5,264,344	5,264,344	5,264,344	5,264,344	5,264,344	5,264,344	5,264,344	5,264,344	5,264,344	5,264,344	5,264,344	5,264,344
Capital															
Remedies for Current Deficiencies															
Routine Renewals and Replacements	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254
Total Air Force Costs	6,498,597	6,498,597	6,498,597	6,498,597	6,498,597	6,498,597	6,498,597	6,498,597	6,498,597	6,498,597	6,498,597	6,498,597	6,498,597	6,498,597	6,498,597
Privatized Costs															
Net Utility Provider Costs to be Recovered in Rate															
Operating	4,092,974	4,092,974	4,092,974	4,092,974	4,092,974	4,092,974	4,092,974	4,092,974	4,092,974	4,092,974	4,092,974	4,092,974	4,092,974	4,092,974	4,092,974
Capital															
Remedies for Current Deficiencies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Routine Renewals and Replacements	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254	1,234,254
Air Force Management															
Air Force Program Oversight (FAS)	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994	12,994
Transition Costs															
Total Privatized Cost	5,340,221	5,340,221	5,340,221	5,340,221	5,340,221	5,340,221	5,340,221	5,340,221	5,340,221	5,340,221	5,340,221	5,340,221	5,340,221	5,340,221	5,340,221
Savings ($)	1,158,376	1,158,376	1,158,376	1,158,376	1,158,376	1,158,376	1,158,376	1,158,376	1,158,376	1,158,376	1,158,376	1,158,376	1,158,376	1,158,376	1,158,376
Savings (%)															

10.0 Marketing Strategy

RESERVED

11.0 Recommendations

As concluded in the previous sections, privatization of the electric, natural gas, water, and wastewater systems at Lackland AFB appears to be feasible. Risks associated with operational impacts from privatization can be mitigated. There is sufficient market interest, and regulatory conditions exist, to allow the Air Force to conduct a competitive source selection for sale of each system. Procurement of utility services from each system's new owner is feasible; service area and franchise conditions can be managed. In addition, enough prospective purchasers are interested in multiple utilities at Lackland AFB, and at other bases included in the TRDP, to warrant bundling of utility systems within bases and among bases.

Except for operational risks, conditions for the Lackland TEP also favor privatization. However, operational risks associated with privatization of this utility system might well exceed the Air Force tolerance for risk, even with mitigation measures in place.

On the basis of these conclusions, the following recommendations are made:

1. Make a final determination as to whether mitigated risks associated with privatization of the Lackland TEP system warrants excluding this system from privatization.

2. Drop further consideration of TEP privatization if the Air Force decides mitigated risks associated with the action are beyond Air Force tolerance.

3. Proceed to Phase II of the Air Force's three-phase utility privatization process for the electric, natural gas, water, and wastewater systems. If privatization of the TEP is within Air Force risk tolerance, also proceed with Phase II for that system. Although the final feasibility of privatizing these systems will not be known with certainty until the end of Phase III, there is enough strength in the findings of this preliminary analysis to warrant proceeding with the process**.**

4. Conduct a competitive source selection for each of the utility systems that will be further considered for privatization.

5. Offer each of the utility systems for sale as part of optional bid packages. In order to obtain the highest value for these systems and future utility service, each of these utility systems should be bundled in a number of optional bid packages as described in Section 10.0.

6. Finalize a list of mitigation measures that need to be implemented as part of privatization. As appropriate, include mitigation provisions as requirements for the new utility service provider.

7. Notify entities who submitted SOIs to inform them of the Air Force decision about plans to request formal proposals for purchase of the utility systems and provision of on-going utility service. For utilities that will be further considered for privatization, issue a press release to advertise that RFPs will be forthcoming. This will help prepare interested parties to submit proposals once the they are formally requested.

Wing Commander Recommendation: Exempt the TEP from further study of privatization because it is essentially a large mechanical room whose sole purpose is to provide energy for WHMC.